Iris Biotech

RESIN GUIDELINE

Version: IB10_4

Empowering Peptide Innovation

With this guiding theme in mind, Iris Biotech's mission is to support researchers by supplying

- innovative technologies,
- rare compounds,
- as well as a broad portfolio on standard consumables,

available in flexible quantities from small scale to bulk quantities. To fulfill our dedication "Empowering Peptide Innovation", we are attending various conferences, symposia, and exhibitions each year. This allows us to remain in direct contact with scientists all over the world, both from academia and industry, to exchange knowledge, and to gather new ideas to tackle your current challenges.

Guided by our dedication to provide

- competent service,
- as well as novel substances and
- latest technologies,

Iris Biotech is your trusted partner for the world of peptides, while having strong expertise in associated disciplines. Thus, our portfolio comprises reagents and tools for the synthesis and modification of peptides, e.g., amino acids, resins and solvents but also for related technologies such as drug delivery, linkerology® and life sciences.

Owed to the growing demand for tailor-made compounds, our portfolio is fine-tuned by our custom synthesis service at Iris Biotech Laboratories. Our skilled scientists offer profound expertise in

- *de novo* route development,
- upscaling towards larger scale production,
- as well as synthesis optimization for increased efficiency.

Examples are the synthesis of rare chiral building blocks, unnatural amino acid derivatives, sophisticated orthogonal protecting groups, heterocycles, building blocks for nucleotides, PEGs and PEG-analogs as well as specific linkers for controlled drug delivery and release.

Amino Acids **Building Blocks** **Life Sciences** **Drug Delivery** **Reagents** **Resins** **Linkerology®** **Click Chemistry**

Portfolio Overview

Peptide Synthesis and Modification

(Protected) Amino Acids

Standards such as Fmoc-D/L-AAA and Boc-D/L-AAA, Smoc amino acids for peptide synthesis in water, variety of protecting groups (e.g., Pbf, Trt, ^{t}Bu, Bzl, Acm, Mob, SIT, Phacm, Allocam, Mmt), unusual amino acids, fluorinated derivatives, substituted prolines, arginine analogs

Building Blocks

Amino alcohols, amino aldehydes, diamines and hydrazines, (pseudoproline) dipeptides, polyamines and spermines, fatty acid derivatives, peptide nucleic acids (PNAs)

Reagents

Coupling reagents, solvents and scavengers, protecting groups

Resins

Preloaded resins (e.g., based on Trityl, TCP, TentaGel, Methoxybenzhydryl, Merrifield, PAM, Rink, Wang), scavenger resins, hydrazone resins, poly(acrylamide) resins, Cyclover

Linkerology® and Drug Delivery

Linkers for Solid Phase Peptide Synthesis

Cleavable Linkers

Val-Ala-based, Val-Cit-based, disulfide-based, Dde-helping hands, pH-sensitive linkers

Photo-Activatable Linkers

Functionalized Linkers

Clickable linkers, trifunctional linkers, linkers with maleimide function, cross-linkers, selective N-term acylation and biotinylation, 5HP2O

PROTACs

Ligands, linkers & modules

Fullerenes, Poly(2-oxazolines), Dextrans & Plant-Derived Cholesterol

Superparamagnetic Iron Oxide Nanoparticles

Poly-Amino Acids

Poly-Arg, Poly-Glu, Poly-Lys, Poly-Orn, Poly-Sar

PEGylation

Branched PEGylating reagents, (amino-)PEG-acids, PEG-amines & hydrazides & guanidines, reagents for Click-conjugation, Biotin-PEG-reagents, PEG-thiols, PEG-maleimides, other PEGylating reagents

Life Sciences

Biotinylation Reagents

Carbohydrates

Galactose, Glucose, Mannose, Xylose and others

Drug Metabolites

Peptides

Substrates & Inhibitors

E.g., protein kinase inhibitors, substrates for fusion (Halo/Snap/Clip)-tagged proteins

Natural Products

Dyes and Fluorescent Labels

E.g., ICG, AMC, DAPI

Maillard & Amadori Reaction Products

Large portfolio of derivatives useful as standards for food, pharma and cosmetics industry

Vitamins

Custom Synthesis

Your project requires a compound not listed in our portfolio?
Get in contact and inquire about our custom synthesis capabilities.

Our experienced scientists are excited to accept your synthetic challenge!
In such cases, your request undergoes the following stages:

Step-by-Step Analysis

- Customer's demands

Process Evaluation

- Detailed literature review
- Synthetic possibilities

Strategy Development

- Protocol development
- Method development and validation
- Customized synthesis

Quality Consistency

- Identity confirmation
- Purity verification

Our Service Promise

All our services are based on high standards, transparency & documentation, trust, honesty & confidentiality, as well as the required know-how.

High Standards

- Values: sustainability & responsibility
- State-of-the-art equipment & latest technologies
- High quality standards
- Qualified suppliers & regular audits

Transparency & Documentation

- Talk to our specialists – customer care
- Certificates of analysis & origin
- Impurity profiling
- Safety data sheets
- Analytical and process reports

Trust, Honesty & Confidentiality

- Intergenerational business valuing partnerships
- Meeting the customer's expectations
- Integrity towards our customers

Our Know-How

- One-step reactions & complex multi-step synthesis
- Scalability from mg to kg quantities
- Route scouting

Table of Contents

1. Introduction: The Origins and Background of SP(P)S

The main advantage of solid phase synthesis (SPS) in comparison to classical solution phase synthesis is the fast and easy separation of the desired product and excess reagents by filtration. In the most common form of solid phase synthesis, the molecule being synthesized (e.g., a growing peptide chain) is attached to an insoluble solid support that is swollen in a certain solvent, while reagents are added to the suspension in a dissolved state. By removing excess reagents and dissolved byproducts by filtration and washing, an excess of reagents can usually be employed in SPS, allowing to shorten reaction times and ideally to realize quantitative turnover of the substrate, which in turn leads to higher yields.

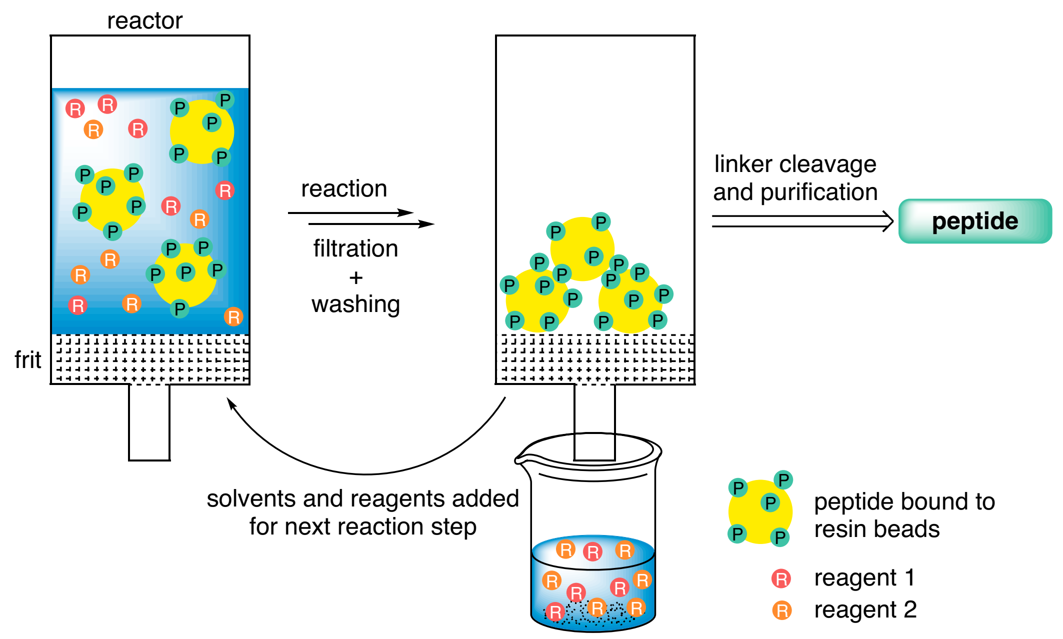

Fig. 1: Solid-supported synthesis enables fast and easy separation of excess reactants from the product, as the latter is bound to insoluble resin beads.

The main advantages of SPS are:

1. Fast work-up through easy separation of the solid support-bound peptide from dissolved reactants and byproducts by filtration, and multiple, rapid washing steps.
2. Improved reaction times, turnover, and yield by use of excess amounts of reagents.
3. The syntheses can easily be automatized.
4. Minimal physical product loss.
5. Pseudo-dilution phenomena on individual beads can enable cyclization and avoid the formation of dimers.

Originally, SPS was developed to overcome the tedious and repetitive way of solution phase synthesis of peptides. Since that time, it has been adapted and optimized for the synthesis and production of other biopolymers such as DNA and RNA, as well as small organic molecules.

A typical solid phase synthesis consists of a series of alternating reaction and washing steps, the repetitiveness of which lends itself well to the (automated) synthesis of oligomeric structures such as oligonucleic acids, or peptides. The first reaction step in any solid phase peptide synthesis is the attachment of a bi- or more-functional amino acid to the solid support. Only one of the building block's functional groups is free to react, while all others are protected to avoid unwanted side-reactions. Next, the second functionality is deprotected, so that a further amino acid can be coupled to the first resin-bound building block. The peptide chain is then elongated by reiterating this sequence of coupling and deprotection cycles. In the final steps, the molecule is cleaved from the resin, and all remaining protecting groups are removed. This general reaction scheme is exemplified in *Fig. 2*.

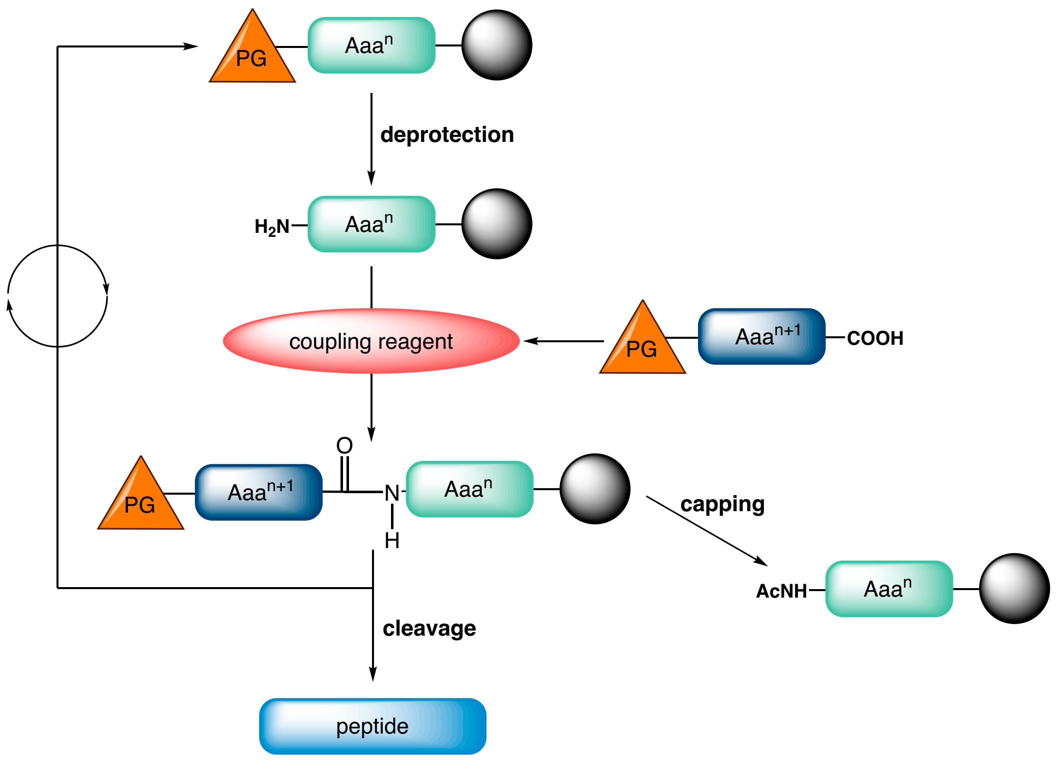

Fig. 2: General reaction sequence of SPS. After attachment of the first building block to the resin, additional building blocks are attached in reaction cycles of deprotection and coupling and the final product is cleaved from the resin.

The downsides of SPS are the high solvent consumption as well as the difficult analysis and process control in between reaction steps. As starting material, intermediates and target molecules are bound to the resin, their ratio cannot be directly determined by the usual methods (e.g., TLC), which makes it difficult to monitor the progress of the reaction.

↑ back to content

1.1. How Solid Phase Chemical Synthesis Started

In the late 1950s and early 1960s, Robert Bruce Merrifield developed solid phase peptide synthesis (SPPS) and demonstrated its useful ness by synthesizing a tetrapeptide. For this pioneering work and his ensuing research on SPPS, he was awarded the Nobel prize in 1984. The original resin named after him is a chloromethylated copolymer of styrene and divinylbenzene, which he chose over cellulose, polyvinyl alcohol, polymethacrylate and sulfonated polystyrene.

This original discovery has survived until today, as most resins are still based on a polystyrene core. Depending on the exact polymerization conditions, the physical properties and morphology of the resin may vary. Especially for large scale syntheses, batch to batch variations of resins have to be monitored closely to ensure a consistent quality.

In parallel to the polystyrene solid support, Merrifield developed the Boc protection strategy for synthesizing peptides. In this strategy, the growing peptide chain is attached to the solid support *via* its C-terminus, while the N-terminus is protected with a Boc group.

References:

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1.2. Modern Synthetic and Strategic Developments of SPPS

Today, modern SPPS is performed using the Fmoc strategy due to the milder deprotection and cleavage conditions compared to the Boc strategy. Similar to the Boc strategy, the C-terminus is attached to the resin, while the N-terminus is protected using the base-labile Fmoc group (*Fig. 3*). Being able to avoid the use of hazardous HF and to reduce the amount of TFA makes the Fmoc strategy more appealing. Moreover, the results for routine peptide syntheses are often superior for the Fmoc strategy. A higher number of different Fmoc building blocks are available, enabling the synthesis of a larger diversity of peptides and/or allowing alternative synthetic strategies that are less laborious, faster, and possibly more economic. In addition, the aromatic systems of the dibenzofulvene and fulvene-piperidine adducts produced during the deprotection step allow the (automated) monitoring of the completeness of the Fmoc removal.

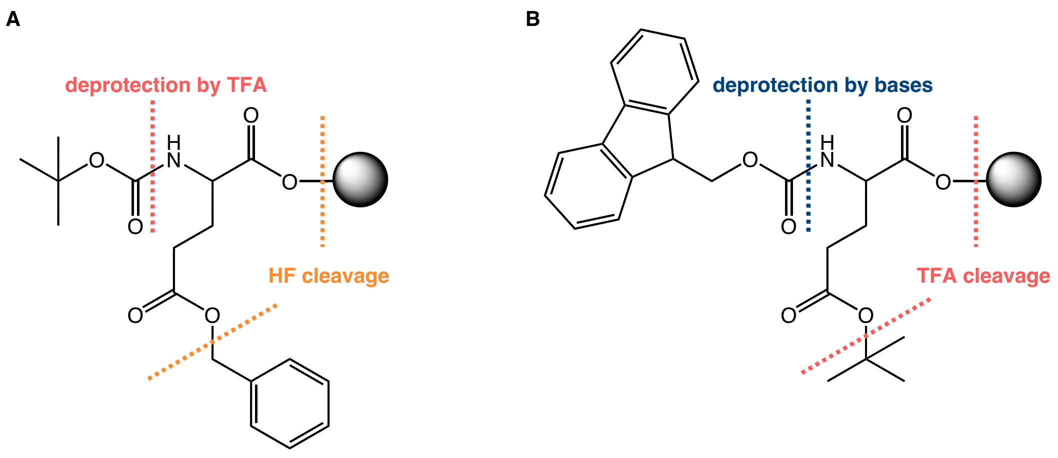

Fig. 3: Comparison of a) Boc strategy and b) Fmoc strategy for SPPS exemplified on a single, fully protected glutamic acid attached to the resin.

Apart from facilitating the synthesis of single structures, the ease of handling of the solid supported molecules has led to a variety of approaches to generate vast libraries of structures using combinatorial approaches. The split-mix technique splits a batch of resin into equal portions to which different molecules are coupled, and subsequently combines and mixes the resin beads. By repeating these steps, extensive libraries of peptides and organic compounds can be generated as a mix within a short time and with relatively low effort. Alternatively, the tea-bag method allows for the parallel synthesis of molecules not as a mixture, but as defined products, since the solid support is enclosed in a so-called teabag which serves as simple reaction vessel.

References:

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→ *Methods for removing the Fmoc group; G. B. Fields;* ***Methods Mol Biol*** *1994;* ***35****: 17-27.* https://doi.org/10.1385/0-89603-273-6:17

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→ *General method for the rapid solid-phase synthesis of large numbers of peptides: specificity of antigen-antibody interaction at the level of individual amino acids; R. A. Houghten;* ***Proc Natl Acad Sci U S A*** *1985;* ***82****: 5131-5135.* https://doi.org/10.1073/pnas.82.15.5131

↑ back to content

Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

2. Physical Properties of Resins

2.1. Shape and Bead Size

The size of the resin beads can be described in different ways. The two most common are the standard US mesh size (also known as Tyler mesh size) and the actual diameter of the resin beads. Both values are correlated to each other in an inverse manner as the density of the mesh of a sieve necessary to retrieve a certain particle size will get higher as the actual diameter of the resin beads gets smaller (*Fig. 4*). The smaller the beads are, the faster the reaction kinetics will be, as the surface area is larger in relation to the beads volume and allows for fast diffusion of the reagents into the resin beads. However, if the beads are too small, the filtration time will be extended. For practical purposes a compromise between reaction kinetics and filtration time has to be made, so, a resin with a 100-200 mesh offers the best balance.

Tab. 1: Correlation of particle size, number of beads per gram of resin and capacity per single bead.

Size/µm	Beads/g	Capacity/bead [nmol] (for polystyrene, = 1 mmol/g)	Capacity/bead [nmol] (for TentaGel® S, = 0.28 nmol/g)
750	4,620	232	65
700	5,010	196	55
650	6,260	157	44
600	7,960	125	35
550	10,340	96	27
500	13,760	71	20
450	18,870	53	15
400	26,870	36	10
350	40,110	25	7
300	63,690	14	4
250	110,060	9	2.5
200	214,970	4.6	1.3
180	294,880	3.4	0.94
150	509,550	2	0.55
130	782,770	1.3	0.35
100	1.72×10^{6}	0.6	0.16
90	2.86×10^{6}	0.4	0.1
35	4.55×10^{7}	22×10^{-3}	6.2×10^{-3}
20	2.4×10^{8}	3.6×10^{-3}	1×10^{-3}
10	1.95×10^{9}	3.6×10^{-4}	1.3×10^{-4}
5	1.54×10^{10}	6.4×10^{-5}	1.8×10^{-5}

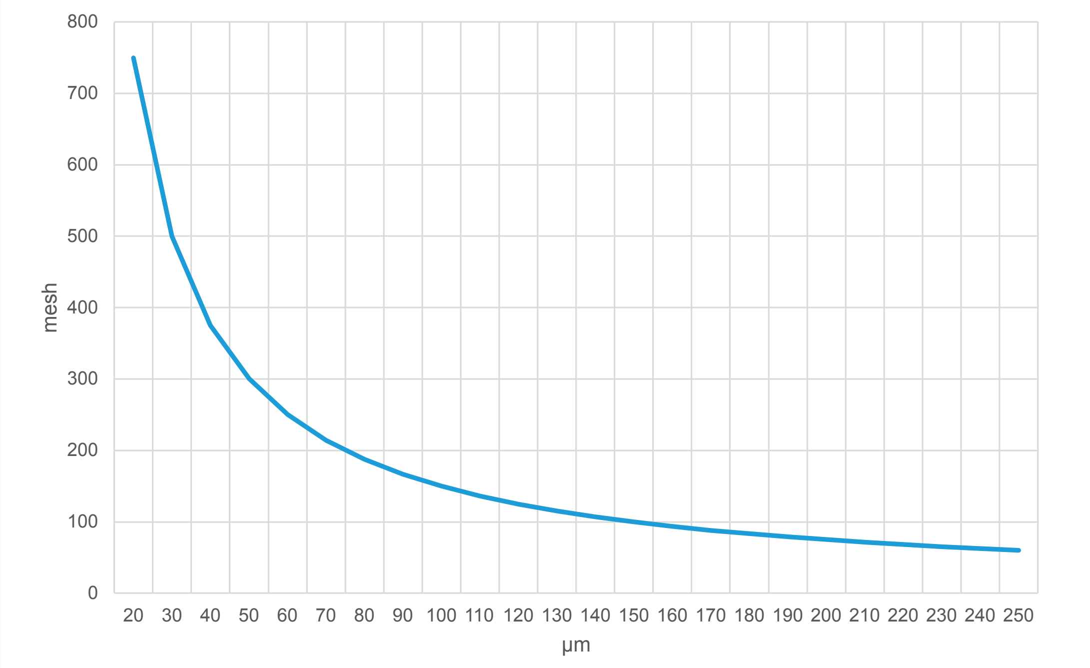


Fig. 4: Relation between mesh size and bead size of the particle. The higher the mesh size, the smaller the resin beads ("US Mesh vs. Micron." www.filterbag.com/U-S-Mesh-vs-Micron-21.html).

2.2. Cross-linkage and Swelling

The most common resins are based on polystyrene (PS). These resins can be further functionalized with spacers (e.g., PEG-based) in order to alter the swelling behaviour in certain solvents, as well as to allow for different chemical strategies. Aside from polystyrene, other matrices are used as basis for resins in SPPS, including polyacrylate, polyethylene glycol, and polyacrylamide. By modifying a resin with a grafted spacer or by changing the nature of a core polymer, the properties of a solid support can be adjusted to a given solvent to allow for a high swelling. Good swelling properties are an important factor for the choice of the solid support, since reaction kinetics in SPS are diffusion controlled, i.e. the reaction rates are higher the faster the reactants are able to diffuse into the resin. This holds especially true for the synthesis of large molecules, where a high swelling ensures sufficient space for the growing molecule, and thus minimizes aggregation. Otherwise, deprotection or coupling reactions may be hampered or even completely inhibited, leading to a low yield of the final product.

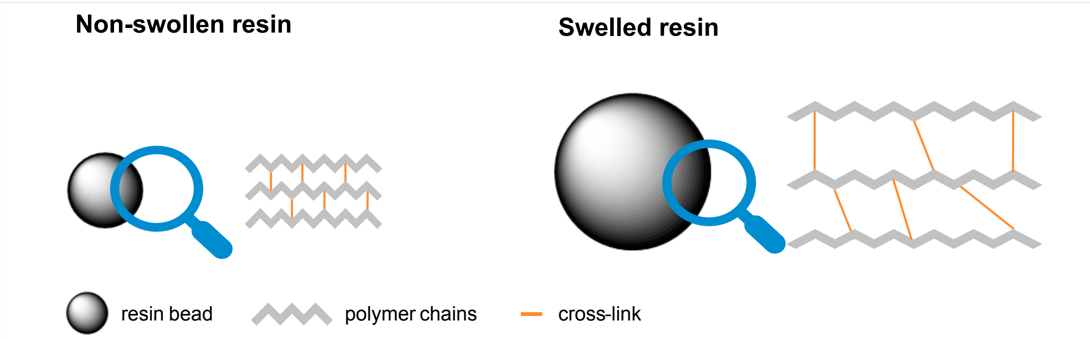


Fig. 5: Schematic representation of the impact of swelling: Swelled resins provide space for reagents and the growing peptide chains.

↑ back to content

Polystyrene resins are prepared by radical polymerization. The three-dimensional resin network is established by crosslinking the linear polymer chains with divinylbenzene (DVB) (*Fig. 6*).

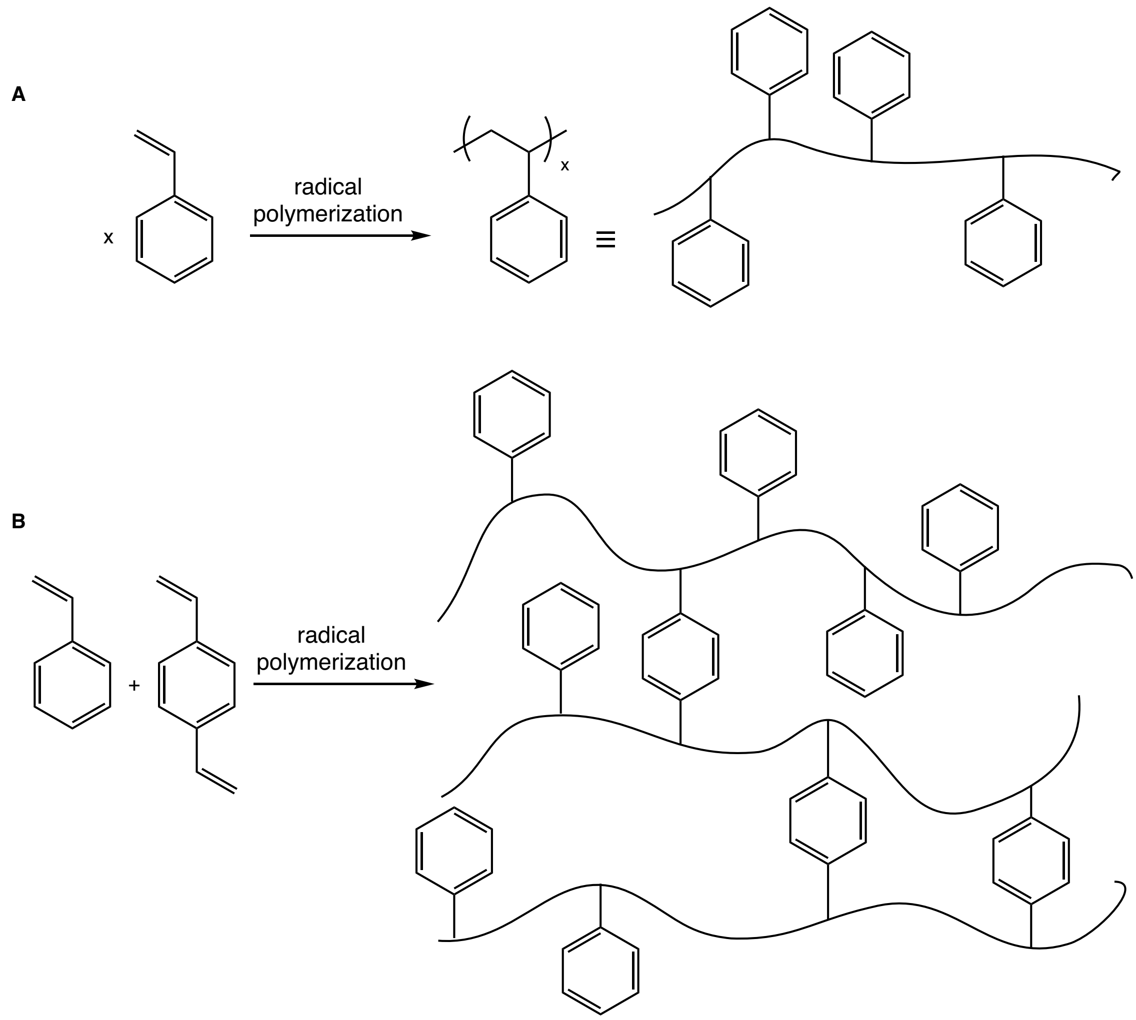


Fig. 6: (A) Radical polymerization of styrene alone leads to single-stranded polystyrene chains.
(B) A crosslinked network of these styrene chains is established by adding divinylbenzene to the reaction.

Polystyrene resins are typically crosslinked with 1% to 2% of DVB. In general, the higher the degree of crosslinking, the lower the swelling of the corresponding resin in a given solvent (*Fig. 7*). By attaching spacers to the polystyrene core, the properties of the PS-based solid support can be altered, a fact that can be used to tailor the resin's swelling properties to be compatible with certain solvents. For example, by grafting PEG spacers to the polystyrene core, even water can be used as solvent to swell the resin sufficiently, as exemplified by TentaGel® resin that exhibits good swelling in both aqueous solutions and organic solvents.

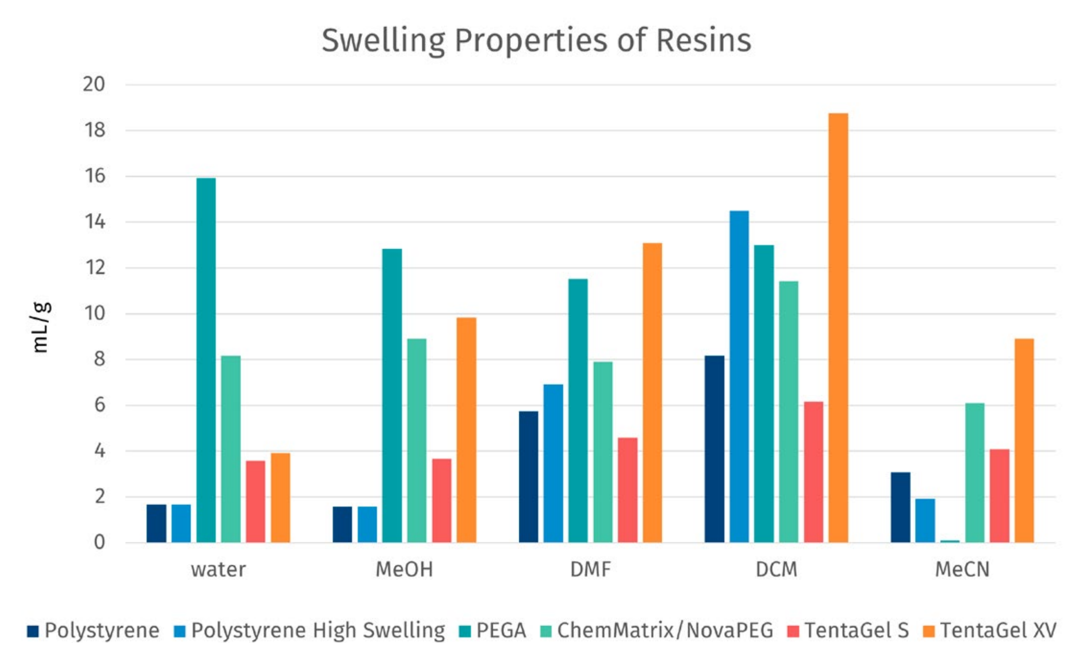


Fig. 7: Swelling characteristics of differently functionalized resins. Depending on the intended use and reaction conditions, resins optimized for hydrophilic and more hydrophobic solvents are available.

The efficiency of peptide synthesis is also significantly influenced by the chosen solvents, alongside the role of linkers and solid support:

Commonly used solvents in SPPS

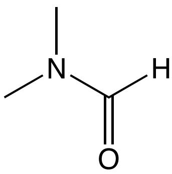
N,N-Dimethylformamide (DMF): DMF is the most widely used solvent in SPPS due to its solubility properties and ability to swell resins. It can dissolve a wide range of polar and non-polar compounds, including amino acids, peptides, and coupling reagents. However, DMF might undergo spontaneous degradation over time, resulting in the release of formic acids and dimethylamine impurities. Dimethylamine is known to be reactive towards the Fmoc protecting group, potentially leading to its removal. Additionally, DMF can sometimes contribute to side reactions, such as diketopiperazine formation. Another disadvantage of DMF is its toxic character, which is why the use of DMF is strictly regulated in the EU.

Product details

SOL-004 DMF

Dimethylformamide (Peptide Grade)

CAS-No.	68-12-2
Formula	C_3H_7NO
Mol. weight	73,1 g/mol



↑ back to content

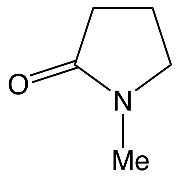
N-Methyl-2-pyrrolidone (NMP): NMP serves as an alternative to DMF in terms of solubility and swelling properties. It is perceived as a safer option due to its lower volatility and reduced health risks in comparison with DMF. Nevertheless, it is important to acknowledge that NMP is still toxic and, therefore, must be handled carefully. Additionally, it has been reported that Fmoc-amino acids exhibit greater decomposition over an extended period when dissolved in NMP as opposed to DMF.

Product details

SOL-009 NMP

N-Methyl Pyrrolidon (Peptide Grade)

CAS-No. 872-50-4
Formula C_5H_9NO
Mol. weight 99,13 g/mol



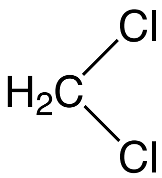
Dichloromethane (DCM): DCM is a non-polar solvent and is often applied to dissolve Boc-protected amino acids. DCM is also commonly used in combination with DMF in Fmoc SPPS to balance polarity and improve resin swelling. It is important to note that DCM might slowly form insoluble precipitation with piperidine when it is used in Fmoc-SPPS, but it is stable towards TFA. Moreover, DCM is volatile, poses environmental hazards, and is a suspected carcinogen.

Product details

SOL-002 DCM

Dichloromethane (Peptide Grade)

CAS-No. 75-09-2
Formula CH_2Cl_2
Mol. weight 84,93 g/mol



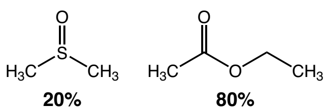
Dimethyl Sulfoxide (DMSO): DMSO is a polar aprotic solvent often used in SPPS for the synthesis of difficult/aggregating peptide sequences. It has high polarity and good solvent properties but is less commonly used than DMF due to its higher viscosity and potential for oxidation under acidic conditions. Recent studies have described DMSO as an environmentally friendly solvent, especially in combination with other solvents such as ethyl acetate (EtOAc).

Product details

SOL-021 DMSO/EtOAc (2 : 8)

Ethyl acetate/ Dimethyl sulfoxide 80/20 (v/v)

CAS-No. 67-68-5 / 141-78-6
Formula C_2H_6OS / $C_4H_8O_2$
Mol. weight 78,13 / 88,11 g/mol



Tetrahydrofuran (THF): The use of THF, a polar aprotic solvent, is not widely spread in SPPS. This might be due to the tendency of THF to form peroxides. However, THF is described for PEG-based resins and coupling of sterically hindered amino acids. It is often applied in combination with other solvents, such as acetonitrile (ACN).

Acetonitrile (ACN): ACN is a polar protic solvent which has been described in combination with THF for PEG-based resins.

Ethanol, methanol, and isopropanol: Alcohols such as ethanol and isopropanol are sometimes used in the washing steps to remove excess reagents and byproducts. They are less toxic than many of the other solvents used in SPPS and are more environmentally friendly.

Environmental and Safety Aspects

Several of the common solvents (DCM, DMF, NMP) applied in SPPS might lead to environmental and safety concerns. Consequently, there is a growing interest in the development of environmentally friendly alternatives in SPPS that are less toxic and more sustainable. In recent years, there have been several publications in this field, and new solvents, including 2-methyltetrahydrofuran (2-MeTHF), cyclopentyl methyl ether (CPME), γ-valerolactone (GVL) and N-butylpyrrolidinone (NBP), have been identified as possible replacements for DMF. The reduction of solvent usage, the recycling of solvents, and the development of solvent-free or aqueous-based peptide synthesis methodologies are actively being investigated as potential strategies for further improvement of the sustainability in SPPS.

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↑ back to content

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Not only spacers have an influence on the swelling properties, but also the crosslinking of the core resin. For the TentaGel® resin, a reduction of the polystyrene core crosslinking resulted in higher swelling properties of the extended volume (XV) resin versus the original TentaGel® S polymer. High swelling creates an extended reaction space, which is a prerequisite for the synthesis of difficult sequences, aggregating peptides, mini proteins and PNAs in high purities and good yields (*Fig. 8*).

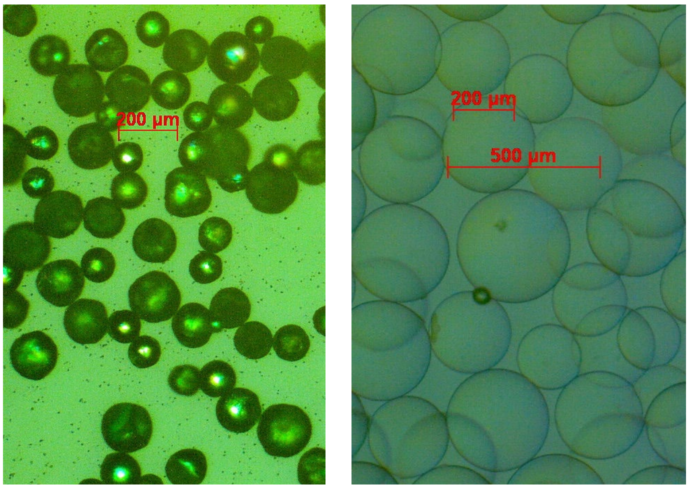

Fig. 8: TentaGel® resin as seen under the microscope. Left: dry TentaGel® XV. Right: TentaGel® XV swollen in DMF, showcasing the resin's eponymous extended volume which is useful for the synthesis of long and difficult sequences.

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2.3. Resin Substitution

Another important characteristic of solid supports is the quantity of accessible functional groups. The number of these reactive sites is expressed in millimole per gram of resin and is called the resin substitution. When loading amino acids to a resin and determining this loading gravimetrically, the loading will be higher for amino acids with lower MW than for heavier amino acids. This fact results from the increasing weight of the loaded resin with growing MW of the attached amino acid and the proportional decrease of millimoles per gram.

This is summarized in the following formula for weight gain substitution:

$$S_{(Wt)} = \frac{Wt_{(g)} \cdot 1000}{Wt_{(add)} \cdot Wt_{(t)}}$$

$S_{(Wt)}$: weight gain substitution [mmol/g]
$Wt_{(g)}$: weight gained by resin [g]
$Wt_{(add)}$: molecular weight added to the resin = MW of amino acid minus MW of leaving group [g/mol]
$Wt_{(t)}$: total weight gain of the resin after loading [g]

The chemical nature of the reactive sites for the different resins with their cleavage conditions, specific uses, synthetic strategies, and protocols how to attach amino acids to the resins are described in the following. For long or difficult sequences, it is often beneficial to choose a resin with low substitution, as possible side-reactions are avoided by a lower local peptide concentration and enlarged reaction space on the resin.

back to content

3. Base Resins

The basis resins for SPPS have functional groups that will generate a very stable bond to the molecules attached to the solid support. Therefore, these resins are not employed directly in SPPS, but usually serve as basis for further modifications. All of them are based on polystyrene and require harsh acidic conditions to cleave the final product. Resins that are functionalized with specific linkers are discussed in the subsequent chapter.

3.1. Merrifield Resin

Merrifield resin is a polystyrene polymer crosslinked by DVB that carries a chloromethylene group attached to the polystyrene backbone as reactive group to attach amino acids. Usually, the functional group of the resin is incorporated by electrophilic aromatic substitution. However, copolymerization can also be used, which results in a more uniform final resin that may exhibit improved swelling properties as well as more uniform reaction kinetics. The standard Merrifield resin often serves as basis for other resins that use linkers to introduce a different swelling behaviour, or reactive groups that allow for different chemistries and synthetic strategies.

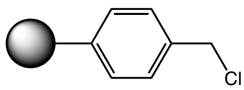

Fig. 9: Merrifield resin.

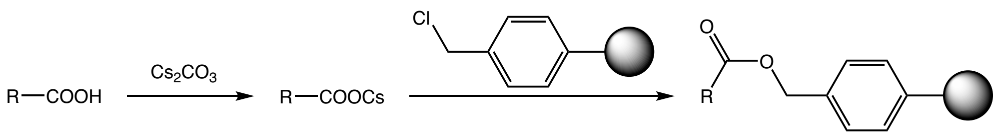

Fig. 10: Loading of Merrifield resin.

The cleavage of substrates from the Merrifield resin requires highly acidic conditions and specialized equipment. Aside from the standard HF procedure, low-high HF methods, as well as trifluoromethanesulfonic acid (TFMSA) and low-high TFMSA protocols can be employed.

Protocol 1: Attachment of Carboxylic Acids to Merrifield Resin

I. Dissolve 1 mmol of carboxylic acid in 5 mL methanol and add 0.5 mL water.

II. 20% aq. Cs_2CO_3 is added to adjust the solution to pH 7.

III. The solution is evaporated to dryness under reduced pressure.

IV. Add 2.5 mL DMF to the residue and evaporate to dryness under reduced pressure.

V. Repeat step IV.

VI. Swell the resin for 1 h in DMF (6-8 mL per gram of resin) in a flask with heating mantle and thermometer on an orbital shaker.

VII. Add 1 eq. (based on the chlorine substitution of the resin) of carboxylic acid caesium salt to the resin.

Note: the caesium salt must be absolutely dry to achieve optimal results.

VIII. The mixture is shaken at 50 °C for 24 h.

IX. Remove the solution by filtration and wash the resin with DMF, followed by 50% (v/v) aq. DMF, then 50% (v/v) aq. methanol and finally pure methanol.

X. Dry the resin to constant weight under reduced pressure.

Note: If desired, the reaction can be checked for completeness by treating an aliquot of the resin with a solution of 4-(4-nitrobenzyl) pyridine in DMF/DCM.

As an alternative to this caesium salt-based method, a potassium fluoride method can be employed.

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Introduction: The Origins and Background of SP(P)S | Physical Properties of Resins | Base Resins | Resins and Linkers for the Synthesis of Peptide Acids | Resins and Linkers for the Synthesis of Peptide Amides | Hydrazone Resins | Scavenger Resins | Standard Protocols for Peptide Synthesis | Product Catalogue | Index

↑ back to content

3.2. Hydroxymethyl Resin

As incomplete Merrifield resin loading may lead to unwanted side reactions of the unreacted chloromethyl groups during peptide synthesis, the hydroxymethyl analog was developed as alternative. For this resin, free hydroxyl groups can be capped with acetic anhydride.

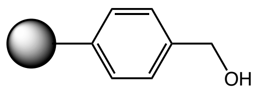

Fig. 11: Hydroxymethyl resin.

Protocol 2: Attachment of Carboxylic Acids to Hydroxymethyl Resin

I. Swell the resin in DMF using 15 mL solvent per gram of resin.

II. Dissolve 1.5 to 2.5 eq. (relative to the reactive sites on the resin) of carboxylic acid in another vessel with a minimum amount of DMF.

III. Add the same amount of eq. of OxymaPure and dissolve. If necessary, add more DMF.

IV. Add the solution to the resin.

V. Dissolve 0.1 eq. (relative to the reactive sites on the resin) of DMAP in a minimum amount of DMF in a separate vessel.

VI. Add 1 eq. (relative to the amino acid) of DIC to the resin and subsequently add the DMAP solution and close the container with a drying tube.

VII. Shake the solution for 2 to 3 h at room temperature.

VIII. Add 2 eq. (relative to the reactive sites on the resin) of acetic anhydride and pyridine to the mixture and shake for 30 min.

IX. Remove the solution by filtration and wash the resin 3 times with DMF, 3 times with DCM, and finally 3 times with methanol.

X. Dry resin to constant weight under reduced pressure.

The conditions for cleaving substrates from the hydroxymethyl resin are the same as for the conventional Merrifield resin.

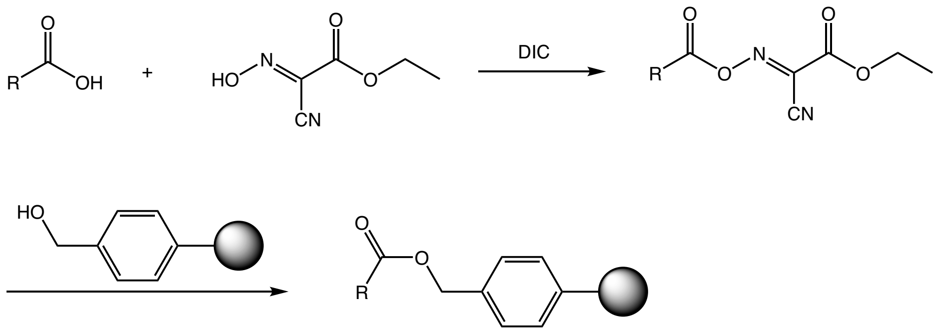

Fig. 12: Loading of hydroxymethyl resin.

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3.3. Amino Core Resins

Amino core resins were originally developed for preparing C-terminal peptide amides *via* the Boc SPPS strategy. The aminomethyl (AM) resin is structurally similar to the Merrifield and hydroxymethyl resin having an amino group instead of a chloro- or hydroxyl-group, respectively. Additionally, two sterically more demanding resins have been developed with the benzhydrylamine (BHA) and 4-methylbenzhydryl-amine (MBHA) resins. Although the BHA and especially the MBHA resin are more sensitive to acid than the AM resin, they still require harsh acidic conditions (HF or TFMSA) for the final product cleavage.

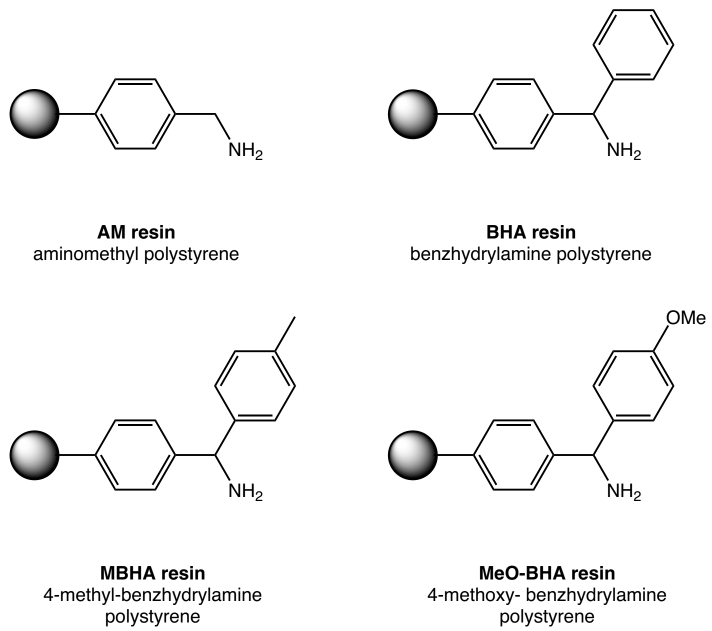

Fig. 13: Various amino core resins.

↑ back to content

Protocol 3: Attachment of Carboxylic Acids to Aminomethyl Resin

I. Swell the resin in DMF using 15 mL solvent per gram of resin.

II. Dissolve 1.5 to 2.5 eq. (relative to the reactive sites on the resin) of carboxylic acid in a separate vessel with a minimum amount of DMF.

III. Add the same number of equivalents of OxymaPure and dissolve. If necessary, add more DMF.

IV. Add the solution to the resin.

V. Add 1 eq. (relative to the amino acid) of DIC to the container with the resin and close the vessel with a drying tube.

VI. Shake the solution for 2 to 3 h at room temperature.

VII. Add 2 eq. (relative to the reactive sites on the resin) of acetic anhydride and pyridine to the mixture and shake for 30 min.

VIII. Take a small sample of resin, wash with DCM and perform a Kaiser test. If free amines are detected, repeat step VII. with 1 eq. of reagents.

IX. Remove the solution by filtration and wash the resin 3 times with DMF, 3 times with DCM, and finally 3 times with methanol.

X. Dry resin to constant weight under reduced pressure.

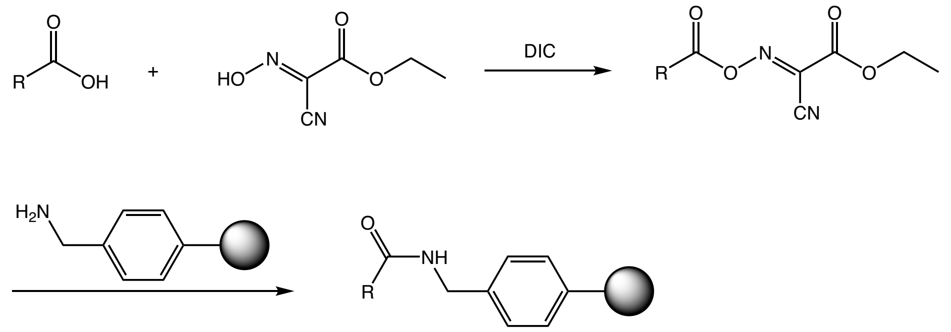

Fig. 14: Loading of aminomethyl resin.

Protocol 4: Attachment of Carboxylic Acids to BHA or MBHA Resin

I. Swell the resin in 10% (v/v) DIPEA in DCM using 10 mL solution per gram of resin for 15 min in an agitated reactor.

II. Filter off the solution and wash with DCM.

III. Add 10 mL of DMF to the resin.

IV. Dissolve 1.5 to 2.5 eq. (relative to the reactive sites on the resin) of carboxylic acid in another container with a minimum amount of DMF.

V. Add the same number of equivalents of OxymaPure and dissolve. If necessary, add more DMF.

VI. Add the solution to the resin.

VII. Put the resin mixture in an ice bath and add 1.0 eq. (relative to the amino acid) of DIC to the resin when the mixture has cooled down. Close the vessel with a drying tube and mix contents by gently moving the vessel.

VIII. Remove the ice bath and let the mixture warm up to RT.

IX. Shake the solution for 4 h at RT.

X. Take a small sample of resin, wash with DCM and perform a Kaiser test. If free amines are detected continue to step XI. Otherwise continue with step XIII.

XI. Add 2 eq. (relative to the reactive sites on the resin) of acetic anhydride and pyridine to the mixture and shake for 30 min.

XII. Take a small sample of the resin, wash with DCM and perform a Kaiser test. If free amines are detected repeat step XI.

XIII. Remove the solution by filtration and wash the resin 3 times with DMF, 3 times with DCM, and finally 3 times with methanol.

XIV. Dry resin to constant weight under reduced pressure.

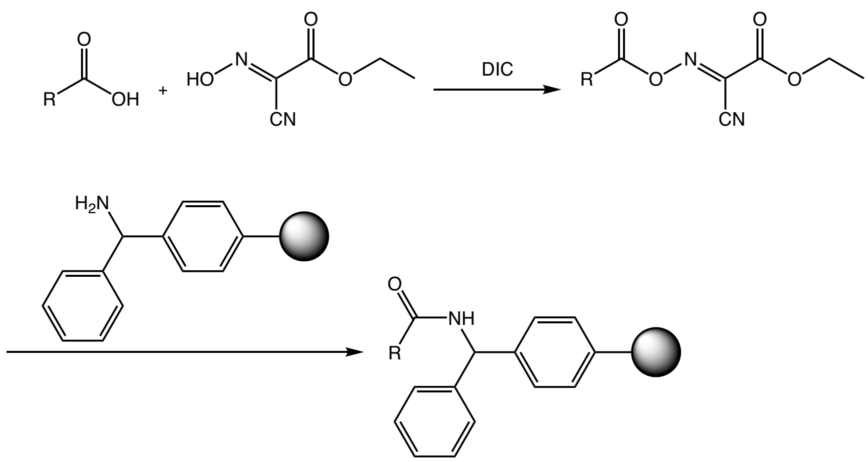

Fig. 15: Loading of BHA resin.

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↑ back to content

Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

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3.4. TentaGel® Resins

TentaGel® resins consist of low cross-linked polystyrene on which poly(ethylene glycol) with a molecular weight of 3000 Da is grafted. The PEG spacer is attached to the polymer matrix *via* an ether bond, which shows high stability towards acid treatment and minimizes PEG leaching. The properties of TentaGel® resins are dominated by PEG, which solubilizes both hydrophobic and hydrophilic compounds. TentaGel® resins are pressure stable and can be used in batch processes as well as under continuous flow conditions.

Through the attachment of polyethylene glycol (PEG) chains to the polystyrene core, the swelling behavior, especially in hydrophilic solvents such as water and methanol, is considerably increased (*Fig. 16*) which allows for a broader range of chemistry. Apart from the swelling behavior, the more hydrophilic environment decreases the repulsion of charged organic intermediates formed during reactions. For the base resin, a range of functional groups is available ranging from electrophilic bromine leaving groups to nucleophilic groups like hydroxy, amino, and carboxy functions.

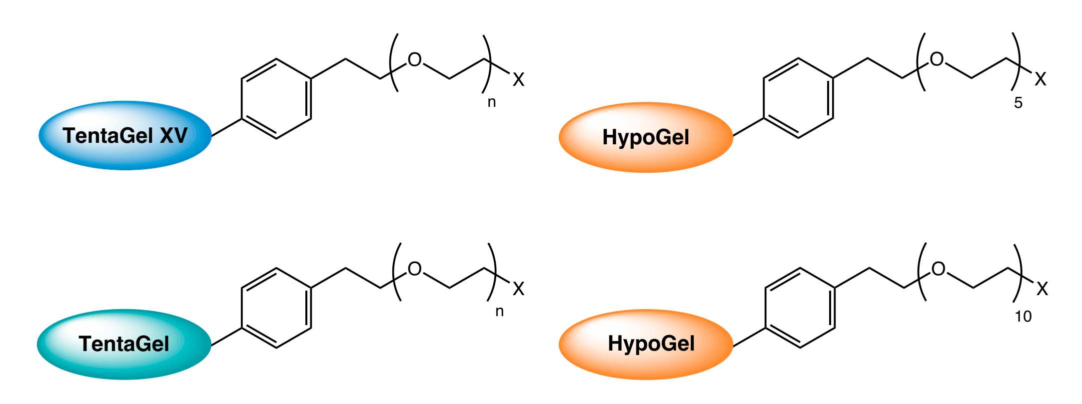

Fig. 16: Left: TentaGel® S (R and HL) and TentaGel® XV are bearing PEG spacers of 3000 Da, while TentaGel® XV is less cross-linked, in order to develop higher swelling properties. Right: HypoGel 200 and HypoGel 400 resins are bearing PEG spacers of 200 (n = 5) and 400 Da (n = 10) respectively.

For the synthesis of hydrophobic peptides, long peptides, and other challenging molecules, it has been demonstrated that an increased swelling volume of the base resin leads to higher yield and purity. In this context, TentaGel® XV (XV = extended volume) has been developed and shows superior results. The high swelling creates an extended reaction volume which provides the ideal conditions for the synthesis of difficult sequences, aggregating peptides, mini proteins and PNAs in high purities and yields.

The polar PEG spacers allow the composite resin to swell in a wide range of solvents including water, methanol, DMF and DCM, while the handling is still easy and comparable to standard TentaGel® resins.

However, a high resin swelling results in a high consumption of solvents. In case increased solubilizing properties are not required, resins with PEG chains shorter than 3000 Da exhibit sufficient solubilizing property with reduced solvent volume consumption. For such purposes, HypoGel 200 and HypoGel 400 have been developed.

Tab. 2: Swelling volume of polystyrene and different PEG-grafted polystyrene resins in different solvents.

Resin/solvent	*H_2O*	*MeOH*	*EtOH*	*DCM*	*Toluene*	*DMF*	*NMP*	*MeCN*	*THF*	*Dioxane*	*Ether*
Polystyrene 1% DVB	–	1.6	1.7	7.5	7.5	4.1	7.0	2.0	7.5	7.0	3.5
TentaGel® S 0.25-0.3 mmol/g	3.6	3.6	2.9	6.3	4.8	4.7	4.9	4.2	5.0	5.4	1.9
HypoGel® 200 0.7-0.9 mmol/g	1.8	2.8	2.6	7.0	5.1	6.0	–	3.0	6.5	6.4	–
HypoGel® 400 0.6-0.8 mmol/g	1.8	2.9	2.8	6.9	5.5	5.2	–	4.6	5.3	5.6	2.6
TentaGel® XV 0.2-0.4 mmol/g	3.6	6.2	2.2	18.0	12.6	13.2	14.4	8.6	13.4	14.2	2.0

General Procedure for Measuring the Resin Swelling:

To remove soluble by-products and impurities, the resin has to be washed with toluene, DCM, DMF and MeOH (5 times for each solvent) and dried. To 1 g of dry resin solvent is added in a 10-15 ml graduated cylinder, and the resin is mixed with 12-18 ml of solvent. The cylinder is sealed and after 2 h the resin is stirred again to remove all remaining air bubbles and to form a homogenous resin suspension. The cylinder is sealed again and after 22 h of settlement the resin volume is measured.

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↑ back to content

Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

3.5. Amino-Li Resin

(Amino-)Li resin, named after its inventor Dr. Yongfu Li, is a novel high-performance poly-acrylamide solid support suitable for the synthesis of peptides and other biomolecules. It is characterized by a high swelling factor and high polarity making it the perfect candidate for synthesis in water, e.g., in combination with Smoc amino acids, but not limited to it. For polar solvents, the swelling is reported with about 6 ml/g in DMF, DMSO and NBP, about 7 ml/g in water, and about 8 ml/g in DCM, but the resin is also compatible with some non-polar reaction media.

Li resin is made from N,N-dimethyl(acrylamide) cross-linked with *N,N'*-bis(acryloyl)piperazine and functionalized with 1-[1-(N-acrylyl)piperidin-4-yl]methanamine. The polymerization uses a proprietary technology to produce fibers similar in size to bead resins but with a larger surface area. The resin structure was selected to obtain a loading of around 0.5 mmol/g.

The aliphatic aminomethylpiperidine moiety of the Li resin is more reactive than the benzhydrylamine or benzylamine used in most polystyrene-based resins, thus facilitating the incorporation of a linker to the resin *via* an amide bond. In addition, this aliphatic amide is more stable to the acidic conditions required during the final deprotection and cleavage step than aromatic amides.

Mechanically, acrylamide-based resins are in general less robust than those with a polystyrene core. Therefore, Li resin suspensions should be gently shaken and drained by gravity, as the forces of mechanical stirring and vacuum filtration tend to collapse the fibers and the resulting fines can affect the rheological properties of the resin and clog the frit.

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→ *A Practical Peptide Synthesis Workflow Using Amino-Li-Resin; D. C. Akintayo, S. Rao Manne, B. G. de la Torre, Y. Li, F. Albericio;* ***Methods Protoc.*** *2022;* ***5(5)****: 72-84.* https://doi.org/10.3390%2Fmps5050072
→ *Amino-Li-Resin-A Fiber Polyacrylamide Resin for Solid-Phase Peptide Synthesis; D. C. Akintayo, B. G. de la Torre, Y. Li, F. Albericio;* ***Polymers (Basel)*** *2022;* ***14(5)****: 928-942.* https://doi.org/10.3390/polym14050928
→ *Novel amino-Li resin for water-based solid-phase peptide synthesis; C. Uth, S. Englert, O. Avrutina, H. Kolmar, S. Knauer;* ***J Pept. Sci.*** *2023;* ***29(12)****: e3527.* https://doi.org/10.1002/psc.3527

3.6. Cyclover-Amine

Cyclover-Amine is a novel soluble tag for the synthesis of peptides and oligonucleotides combining the advantages of both: liquid and solid-phase synthesis. Its structure is defined by a three-fold amino-substituted triazine. Two amino groups are occupied by four hydrophobic saturated C18 alkyl chains. The third amino function of the triazine is modified with piperazine, where a secondary amine is available for further derivatization with a suitable linker.

For (peptide) synthesis, Cyclover-Amine [N2,N2,N4,N4-tetraoctadecyl-6-(1-piperazinyl)1,3,5-triazine-2,4-diamine] and the Fmoc amino acids are dissolved in a defined organic reaction medium, e.g., dichloromethane, or THF (20 mL per gram Cyclover), allowing for an overall uniform distribution of the reactants. After completion of the reaction, e.g., coupling of one amino acid in solution, the product can easily be precipitated by changing the polarity of the solvent, e.g., by adding the 5-fold volume of methanol. Notably, excess reagents and side-products remain dissolved and are washed away in the filtration step. After collection of the precipitate (= the peptide-carrying Cyclover-Amine) by filtration, the next reaction cycle of dissolution and precipitation can be initiated to grow the peptide chain. Alternatively, unwanted molecules also may be removed by liquid-liquid extraction.

The progress of each reaction step may be monitored in process by drawing samples and analyzing them directly by thin layer chromatography or HPLC, without prior isolation/cleavage of the peptide, as required for resin-based protocols.

Cyclover-Amine is robust against acids and oxidants and especially well-suited for the preparation of short peptides. Unreacted activated building blocks may be scavenged with a soluble amine, e.g., N-propylamine, thus isolating and cleaning the peptide before removing Fmoc is not necessary.

After cleaving the completed peptide from the Cyclover-Amine "carrier tag", the product may be isolated by ion exchange chromatography.

One gram of Cyclover-Amine (Mr = 1205 g/mol) corresponds to about 0.83 mmol reactive amino groups and has a similar loading capacity per weight as our Rink amide AM Resins (0.4 - 1.0 mmol/g) or HypoGel® resins (0.5 to 0.9 mmol/g) and a higher capacity than our TentaGel® resins (S: 0.2 to 0.53 mmol/g; H: 0.4 to 0.6 mmol/g).

References:

→ *Improved Tag-Assisted Liquid-Phase Peptide Synthesis: Application to the Synthesis of the Bradykinin Receptor Antagonist Icatibant Acetate; Y. Okada, R. Takasawa, D. Kubo, N. Iwanaga, S. Fujita, K. Suzuki, H. Suzuki, H. Kamiya, K. Chiba;* ***Org. Process Res. and Devel.*** *2019;* ***23(11)****: 2576-2581. https://doi.org/10.1021/acs.oprd.9b00397*

→ *Peptide synthesis beyond DMF: THF and ACN as excellent and friendlier alternatives; Y. E. Jad, G. A.Acosta, S. N. Khattab, B. G. de la Torre, T. Govender, H. G Kruger, A. El-Faham, F. Albericio;* ***Org. Biomol. Chem.*** *2015;* ***13(8)****: 2398-2398. https://doi.org/10.1039/c4ob02046d*

→ *Total synthesis of α-conotoxin MII using a soluble-tag-assisted method; S. Kitada, S. Fujita, Y. Okada, S. Kim, K. Chiba;* ***Tetrahedron*** *2013;* ***69(12)****: 2555-2559. https://dx.doi.org/10.1016/j.tet.2013.01.068*

→ *Liquid-Phase RNA Synthesis by Using Alkyl-Chain-Soluble Support; S. Kim, M. Matsumoto, K. Chiba;* ***Chem. Europe*** *2013;* ***19(26)****: 8615-8620. https://doi.org/10.1002/chem.201300655*

→ *Composition of a lipophilic agent for solution phase synthesis of biomolecules; Y. Li; 2023; US2023/0373936A1 and WO2023/244274A2*

→ *Morpholino oligonucleotide manufacturing method; T. Torii, D. Takahashi, S. Katayama; 2019; US10415036*

→ *Morpholino oligonucleotide manufacturing method; D. Takahashi, T. Torii; 2021; US11028386*

↑ back to content

4. Resins and Linkers for the Synthesis of Peptide Acids

The major driver and advantage of using additional linkers attached to a basis resin are the milder cleavage conditions and a greater variety of functional groups, allowing more and advanced synthetic strategies. Depending on the desired swelling properties and reaction conditions the linkers can be combined with any of the aforementioned basic resins and tailored to the intended use.

4.1. Trityl Resins

Resins functionalized with trityl linkers are highly acid sensitive, as the three phenyl rings stabilize the benzylic carbocation that is generated during cleavage. These cleavage conditions are so mild that only 1% of TFA is needed, and even less acidic protocols using 20% hexafluoroisopropanol (HFIP) are sufficient to cleave the products from the resin. Peptides can therefore be cleaved from the resin with all side-chain protecting groups in place and the N- and C- terminus separately modified e.g., by head-to-tail cyclization or fragment condensation.

Various trityl-based linkers exist with different substitutions on the trityl group that fine-tune the cleavage conditions.

The most popular of these in peptide chemistry is the 2-chlorotrityl chloride resin 2-CTC. Especially for the attachment of alcohols, phenols, thiols and amines the 4-methyltrityl (Mtt), 4-methoxytrityl (Mmt) and 4,4'-dimethoxytrityl (Dmt) resins can be employed. Aside from being used as a linker for resins, both the Mtt and Mmt group are also employed for side-chain protection of lysine and histidine. Besides the ready-to-use chloride resin, hydroxyl variants are also available that have to be chlorinated before loading the amino acids.

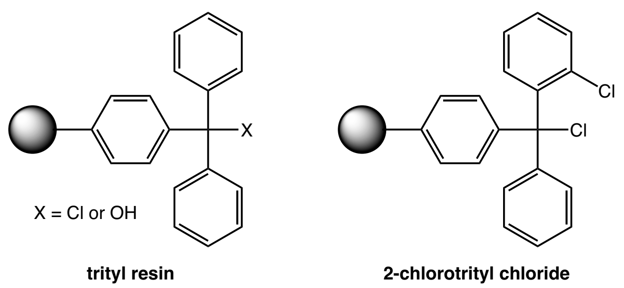

Fig. 17: Trityl resin and 2-chlorotrityl chloride resin.

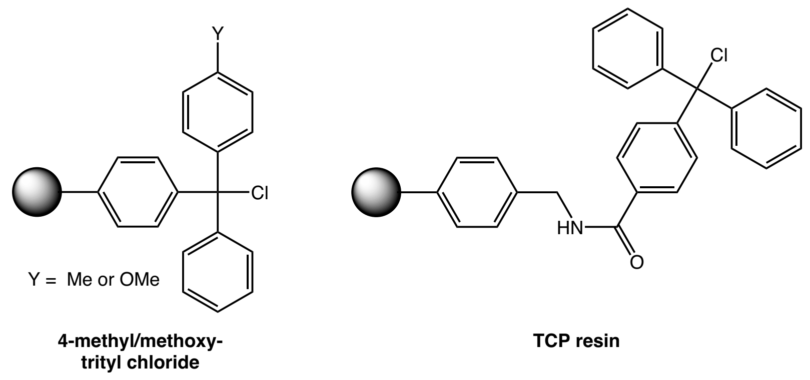

Fig. 18: 4-Methyl/-methoxytrityl resind and TCP resin.

Trityl linkers open up new chemical pathways for modifications after the peptide chain has been built up. Besides that, the steric demand of the trityl group prevents side reactions with proline or N-alkyl amino acids at the C-terminus. If proline is the first or second amino acid at the C-terminus of a peptide, spontaneous diketopiperazine formation can occur and cleave the peptide from the resin. The steric hindrance of trityl linkers is sufficient to prevent this diketopiperazine formation.

Moreover, racemization-prone amino acids such as cysteine and histidine can be attached without enantiomerization, and the reattachment of methionine and tryptophane residues to the resin during the cleaving procedure is minimized.

A further variation of the basic trityl resin are TCP resins. In addition to the advantages of regular trityl resins mentioned above, the *p*-carboxamide group of the TCP-resin exhibits a deactivating effect on the trityl ring system, so that TCP resins are characterized by a well-balanced stability of the anchoring bond. Consequently, preloaded TCP resins are stable under standard storage conditions. Additionally, TCP resins are completely stable towards all common coupling conditions employed in the Fmoc strategy, including HOBt/DIC or Cl-HOBt/DIC at elevated temperatures.

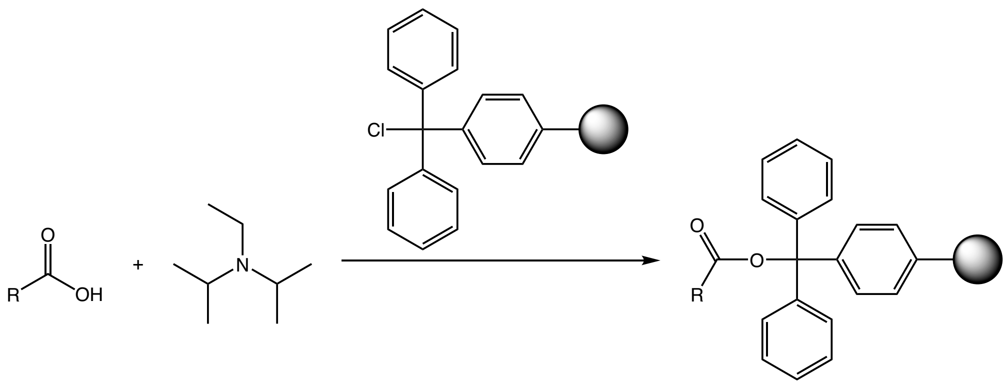

Fig. 19: Loading of trityl resins.

↑ back to content

Protocol 5: Attachment of Carboxylic Acids to Trityl Chloride Resins

I. Pre-swell the resin in dry DCM (10 mL/g resin) for 15 min.

II. Dissolve 1.2 eq. of carboxylic acid in dry DCM.

III. Add 2.5 eq. of DIEA to the solution. This addition can aid the dissolution of the acid.

IV. Filter the excess DCM from the resin and add the reaction mixture.

V. Shake the mixture for 1 h at room temperature.

VI. In order to cap the remaining reactive trityl group, add 1 mL of a solution of methanol and DIEA (5:1; v:v) per gram of resin and agitate the resin for 15 min.

VII. Discard the reaction solution and wash the resin 5 times with DCM and 3 times with methanol.

VIII. Dry the resin to constant weight under reduced pressure.

IX. The loading can be estimated gravimetrically using the formula below:

$$n = \frac{(m_2 - m_1) \cdot 1000}{(MW_{Xaa} - 36.46) \cdot m_2}$$

n = loading of the resin [mol/g of resin]
m_1 = weight of resin before loading [g]
m_2 = weight of resin after loading [g]
MW_{Xaa} = molar weight of attached amino acid [g/mol]

36.46 g/mol is the molecular weight of HCl, which is removed and replaced by the amino acid.

X. Take a small sample of resin, wash with DCM and perform a Kaiser test. If free amines are detected continue to step XI. Otherwise continue with step XIII.

XI. Add 2 eq. (relative to the reactive sites on the resin) of acetic anhydride and pyridine to the mixture and shake for 30 min.

XII. Remove solution by filtration and wash the resin 5 times with DCM, and finally 3 times with methanol.

XIII. Dry the resin to constant weight under reduced pressure.

References:

→ *Application of 2-chlorotrityl resin in solid phase synthesis of (Leu15)-gastrin I and unsulfated cholecystokinin octapeptide. Selective O-deprotection of tyrosine; K. Barlos, D. Gatos, S. Kapolos, C. Poulos, W. Schafer, W. Q. Yao;* ***Int J Pept Protein Res*** *1991;* ***38****: 555-561.* https://doi.org/10.1111/j.1399-3011.1991.tb01539.x

→ *Solid phase synthesis of partially protected and free peptides containing disulphide bonds by simultaneous cysteine oxidation-release from 2-chlorotrityl resin; K. Barlos, D. Gatos, S. Kutsogianni, G. Papaphotiou, C. Poulos, T. Tsegenidis;* ***Int J Pept Protein Res*** *1991;* ***38****: 562-568.* https://doi.org/10.1111/j.1399-3011.1991.tb01540.x

→ *2-Chlorotrityl chloride resin. Studies on anchoring of Fmoc-amino acids and peptide cleavage; K. Barlos, O. Chatzi, D. Gatos, G. Stavropoulos;* ***Int J Pept Protein Res*** *1991;* ***37****: 513-520.*

→ *Veresterung von partiell geschützten peptid-fragmenten mit harzen. Einsatz von 2-chlortritylchlorid zur synthese von Leu15 -gastrin I; K. Barlos, D. Gatos, S. Kapolos, G. Papaphotiu, W. Schäfer, Y. Wenqing;* ***Tetrahedron Lett.*** *1989;* ***30****: 3947-3950.* https://doi.org/10.1016/s0040-4039(00)99291-8

→ *Synthese von Calcitonin-Derivaten durch Fragmentkondensation in Lösung und am 2-Chlortrityl-Harz; K. Barlos, D. Gatos, G. Papaphotiou, W. Schäfer;* ***Liebigs Ann. Chem.*** *1993;* ***1993****: 215-220.* https://doi.org/10.1002/jlac.199319930139

→ *Darstellung geschützter peptid-fragmente unter einsatz substituierter triphenylmethyl-harze; K. Barlos, D. Gatos, J. Kallitsis, G. Papaphotiu, P. Sotiriu, Y. Wenqing, W. Schäfer;* ***Tetrahedron Lett.*** *1989;* ***30****: 3943-3946.* https://doi.org/10.1016/s0040-4039(00)99290-6

4.2. Wang Resins

The Wang resin might at first glance look very similar to the original Merrifield resin, but the cleavage conditions are significantly milder (50% (v/v) TFA in DCM) due to the alkoxy group of the para alkoxybenzyl alcohol linker. These mild cleavage conditions made the Wang resin popular not only in the peptide field, but also among organic chemists in general, as it can also be used to attach e.g., phenols and alcohols.

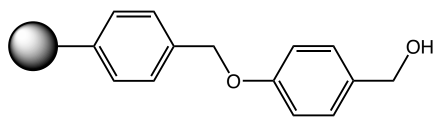

Fig. 20: Wang resin.

To load the Wang resin with carboxylic acids, protocol 2 (*Protocol 2: Attachment of Carboxylic Acids to Hydroxymethyl Resin on page 15*) can be employed.

References:

→ *p-alkoxybenzyl alcohol resin and p-alkoxybenzyloxycarbonylhydrazide resin for solid phase synthesis of protected peptide fragments; S. S. Wang;* ***J. Am. Chem. Soc.*** *1973;* ***95****: 1328-1333.* https://doi.org/10.1021/ja00785a602

→ *Improved synthesis of 4-alkoxybenzyl alcohol resin; G.-s. Lu, S. Mojsov, J. P. Tam, R. B. Merrifield;* ***J. Org. Chem.*** *1981;* ***46****: 3433-3436.* https://doi.org/10.1021/jo00330a009

→ *Solid phase synthesis of azabicyclo[4.3.0]nonen-8-one amino acid derivatives via intramolecular Pauson- Khand cyclization; G. L. Bolton;* ***Tetrahedron Lett.*** *1996;* ***37****: 3433-3436.* https://doi.org/10.1016/0040-4039(96)00587-4

→ *Stereoselective synthesis of highly functionalised pyrrolidines via 1,3-dipolar cycloaddition reactions on a solid support; S. P. Hollinshead;* ***Tetrahedron Lett.*** *1996;* ***37****: 9157-9160.* https://doi.org/10.1016/S0040-4039(96)02147-8

→ *Solid phase synthesis of 2,3-dihydro-4-pyridones: Reaction of Danishefsky's diene with polymer-bound imines; Y. Wang, S. R. Wilson;* ***Tetrahedron Lett.*** *1997;* ***38****: 4021-4024.* https://doi.org/10.1016/s0040-4039(97)00824-1

↑ back to content

4.3. AC Resin

The 4-hydroxymethyl-3-methoxyphenoxyacetic (AC; sometimes also MHMPA) linker is even more acid labile than the Wang resin due to an additional methoxy group on the aromatic ring. The peptide acid can be cleaved from the resin with 1% TFA while all the side-chain protecting groups are retained.

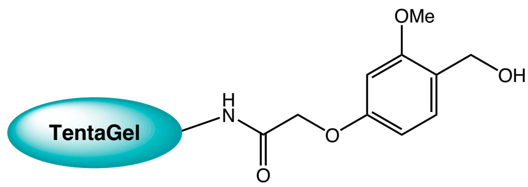

Fig. 21: AC TentaGel® resin.

Reference:

→ *A new protecting group combination for solid phase synthesis of protected peptides; R. C. Sheppard, B. J. Williams;* ***J. Chem. Soc. Chem. Commun.*** *1982; 587-589.* https://doi.org/10.1039/c39820000587

4.4. PAM Resin

The 4-hydroxymethyl-phenylacetamidomethyl functionalized PAM resin is widely used in Boc-chemistry, as it is more stable towards acids and allows the synthesis of medium-sized to large peptides.

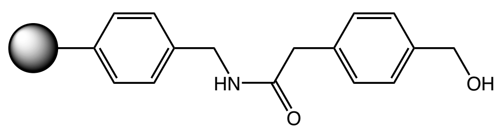

Fig. 22: PAM resin.

Protocol 2 (*Protocol 2: Attachment of Carboxylic Acids to Hydroxymethyl Resin on page 15*) is suitable to load carboxylic acids on the PAM resin, and cleavage is achieved similar to the Merrifield resin.

References:

→ *The synthesis of ribonuclease A; B. Gutte, R. B. Merrifield;* ***J. Biol. Chem.*** *1971;* ***246****: 1922-1941.* https://doi.org/10.1016/S0021-9258(18)62396-8

→ *α-(Phenylacetamido)benzylpolystyrene (pab-resin); E. Giralt, D. Andreu, M. Pons, E. Pedroso;* ***Tetrahedron*** *1981;* ***37****: 2007-2010.* https://doi.org/10.1016/s0040-4020(01)97954-2

→ *tert-Butoxycarbonylaminoacyl-4-(oxymethyl)-phenylacetamidomethyl-resin, a more acid-resistant support for solid-phase peptide synthesis; A. R. Mitchell, B. W. Erickson, M. N. Ryabtsev, R. S. Hodges, R. B. Merrifield;* ***J. Am. Chem. Soc.*** *1976;* ***98****: 7357-7362.* https://doi.org/10.1021/ja00439a041

4.5. HMBA Resin

Resins with hydroxymethylbenzoic acid (HMBA) linkers are regarded as one of the most versatile solid supports for SPPS. HMBA linkers are attached to amine base resins and are stable to acidic cleaving conditions. In contrast to the other resins and linkers highlighted before, the cleavage from the resin is achieved by a range of nucleophiles, thus various C-terminal modifications such as alcohols, methyl esters, hydrazides or amides can be synthesized.

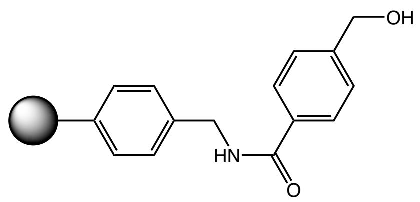

Fig. 23: HMBA resin.

Similar to Wang and PAM resins, protocol 2 (*Protocol 2: Attachment of Carboxylic Acids to Hydroxymethyl Resin on page 15*) can be used to load carboxylic acids to the HMBA resin.

Reference:

→ *Acid-labile resin linkage agents for use in solid phase peptide synthesis; R. C. Sheppard, B. J. Williams;* ***Int. J. Pept. Protein Res.*** *1982;* ***20****: 451-454. https://doi.org/10.1111/j.1399-3011.1982.tb03067.x*

4.6. Benzhydryl Resins

Using the *p*-hydroxybenzyl linker (Wang linker) is one of the most frequently applied methodologies to prepare peptides with C-terminal carboxylic acid functions. However, many side reactions have meanwhile been discovered that challenge synthetic chemists to find appropriate purification methods.

However, the coupling of Fmoc-amino acids to *para*-hydroxymethylphenoxymethyl resins using dicyclohexylcarbodiimide (DCC) in the presence of 4-dimethylaminopyridine (DMAP) typically suffers from two problems, namely, the formation of dimers and racemization.

During final treatment, concentrated TFA cleaves the peptide not only at the carboxyl function (the desired position), but also at the phenoxy group, resulting in the formation of unwanted peptide esters. Additionally, alkylation of certain side-chains, such as tryptophane or tyrosine may occur. These impurities may be difficult to separate from the desired product.

Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index
↑ back to content

Another common type of side reaction observed during peptide synthesis on Wang resin is the formation of diketopiperazines by the amino acids on position 1 and 2 of the C-terminus. It becomes a major issue if Pro, glycine or any N_α-methylated amino acids are located on position 1, whereas lysine or amino acids with NH_2-bearing side-chains are present on position 2 (Lys, Orn, Dab or Dap). A typical side reaction observed when cysteine is present at the first position of the C-terminus is the substitution of the thiol group by piperidine during Fmoc removal, leading to the formation of 2-(1-piperidyl)alanine.

Consequently, the final yield may be significantly reduced during peptide synthesis on Wang resin, which affects the cost/efficiency balance in commercial productions. Therefore, new types of resins such as 2-chlorotrityl resin, where such side reactions are excluded by the design of resin and linker, are increasingly becoming the preferred choice of solid support for peptide synthesis.

Besides, based on the Wang-linker, we present a set of protected amino acid loaded oxymethylphenoxy propionic acid (MPPA) building blocks, which serve as precursors for the linkage to amino substituted solid supports (e.g., aminomethyl polystyrene, BHA or MBHA resins) by standard coupling procedures. After successful synthesis, the peptide is released from the resin by TFA-mediated cleavage yielding the free carboxylic acid on the C-terminus. This method guarantees a low and reproducible epimerization level of the C-terminal amino acid in your peptide and allows the synthesis of pure peptides even in large scale.

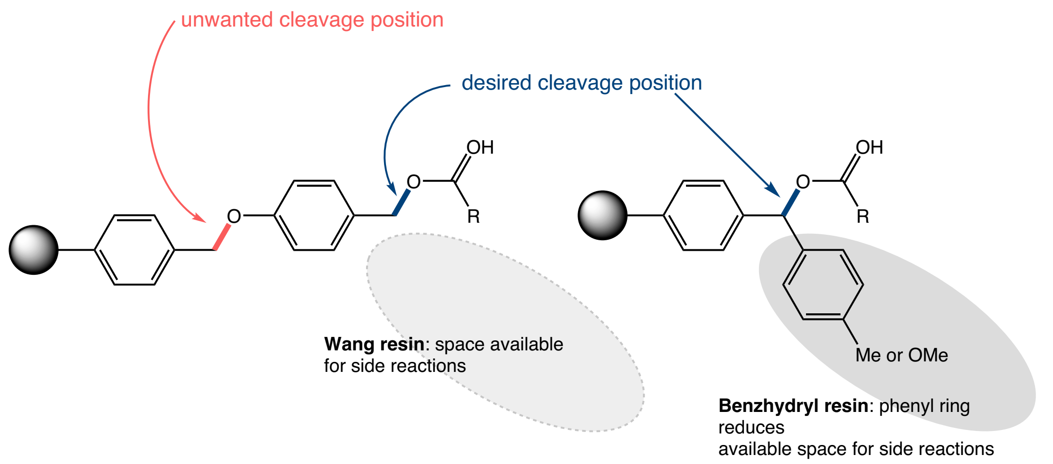

Fig. 24: Advantages of benzhydryl resins over Wang resin with regards to side reactions.

Another alternative type of solid support that is less prone to side reactions than Wang-resins are benzhydryl-based resins. As there is no phenoxy group present, no related side reactions leading to benzyl esters or peptides with alkylated residues can occur. In case of 4-methylbenzhydryl resin, an additional tolyl group is placed as residue. As this does not contribute much to the stability of the resulting carbocation produced during cleavage, conditions are similar to the cleavage conditions typically applied for Wang resin. At least 25% of TFA in DCM with scavengers will liberate the peptide from the resin at room temperature within 30 min.

In case a more acid sensitive resin is required, for example for the production of protected peptide fragments, typically 2-chlorotrityl resin is being used. However, if the sterical hindrance becomes too high, 4-methoxybenzhydryl resin can be used as an alternative.

Protocol 6: Attachment of Carboxylic Acids to 4-Methylbenzhydryl Resin

Note: It is important to use anhydrous solvents and dry reaction vessels.

I. Weigh out 1 mmol of 4-methylbenzhydryl bromide resin in a flask.

II. Add DCM and let the resin swell for 15 to 20 min.

III. Filter and wash the resin with DCM.

IV. Weigh 2 mmol of carboxylic acid, 2 mmol of CsI, 4 mmol DIPEA and add DMF. Let the mixture stand until the solution becomes clear.

V. Add the mixture to the swollen resin and let it react for 14 h at 20°C to 25°C.

VI. Add MeOH and shake for 2 h.

VII. Filter off the resin and wash 6 times with DMF and 4 times with DCM.

References:

- *Wang linker free of side reactions; V. Castro, H. Rodriguez, F. Albericio;* ***Org Lett*** *2013;* ***15****: 246-9.* *https://doi.org/10.1021/ol303367s*
- *A side-reaction in the SPPS of Trp-containing peptides; M. Giraud, F. Cavelier, J. Martinez;* ***J. Pept. Sci.*** *1999;* ***5****: 457-61.* *https://doi.org/10.1002/(SICI)1099-1387(199910)5:10<457::AID-PSC215>3.0.CO;2-7*
- *A Re-evaluation of the Use of Rink, BAL, and PAL Resins and Linkers; F. Yraola, R. Ventura, M. Vendrell, A. Colombo, J.-C. Fernàndez, N. de la Figuera, D. Fernández-Forner, M. Royo, P. Forns, F. Albericio;* ***QSAR Comb. Sci.*** *2004;* ***23****: 145-152.* *https://doi.org/10.1002/qsar.200420013*
- *C-terminal N-alkylated peptide amides resulting from the linker decomposition of the Rink amide resin: a new cleavage mixture prevents their formation; P. Stathopoulos, S. Papas, V. Tsikaris;* ***J. Pept. Sci.*** *2006;* ***12****: 227-32.* *https://doi.org/10.1002/psc.706*
- *Safety-catch and multiply cleavable linkers in solid-phase synthesis; M. Pátek, M. Lebl;* ***Peptide Sci.*** *1998;* ***47****: 353-363.* *https://doi.org/10.1002/(sici)1097-0282(1998)47:5<353::Aid-bip3>3.0.Co;2-i*
- *Application of 2-chlorotrityl chloride in convergent peptide synthesis; P. Athanassopoulos, K. Barlos, D. Gatos, O. Hatzi, C. Tzavara;* ***Tetrahedron Lett.*** *1995;* ***36****: 5645-5648.* *https://doi.org/10.1016/00404-0399(50)1036h-*
- *Preparation of New Acid-Labile Resins of sec-Alcohol Type and Their Application in Peptide Synthesis; K. Barlos, D. Gatos, J. Hondrelis, J. M. Matsoukas, G. J. Moore, W. Schaefer, P. Sotiriou;* ***Liebigs Ann. Chem.*** *1989;* ***10****: 951-955.*
- *Improved approach for anchoring Nalpha-9-fluorenylmethyloxycarbonylamino acids as p-alkoxybenzyl esters in solid-phase peptide synthesis; F. Albericio, G. Barany;* ***Int. J. Peptide. Protein. Res.*** *1985;* ***26(1)****: 92-97* *https://doi.org/10.1111/j.1399-3011.1985.tb03182.x*

Stablility of Benzyl-type Protecting Groups and Linkers

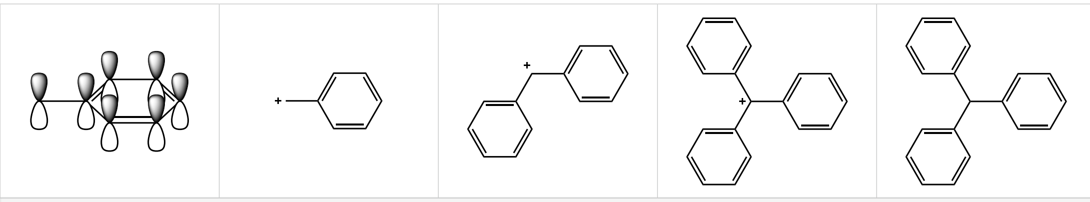

Fig. 25: Stability of the carbenium ions of benzyl, benzhydryl and trityl.

Benzyl, Benzhydryl and Trityl moieties are frequently used as protecting groups, as linkers for solid phase synthesis, or as important structural elements of both categories. The reason for this popularity is that the bond between benzylic carbons and neighbouring moieties can be cleaved under relatively mild conditions. This is a result of the high degree of stabilization of the carbenium ion on the benzylic position that is formed upon acidic cleavage by delocalization of the positive charge. The degree of delocalization is higher and thus the stabilization stronger the more phenyl rings are attached to the benzylic position.

Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

↑ back to content

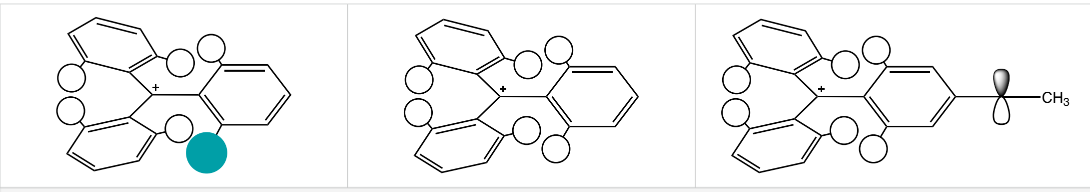

Fig. 26: The stability of benzyl-type carbenium ions can be influenced by substituents.

The stability of benzyl-type protecting groups and linkers can be fine-tuned by the incorporation of substituents on the phenyl rings that modify the electron density on the benzylic position, or change the degree of overlap of the p-orbitals of several phenyl rings. In the former category, methyl and methoxy groups are the most frequently used substituents to further stabilize benzylic carbocations, thereby allowing for even milder cleavage conditions. In the latter category, chlorine is the most common substituent. In trityl groups, the large atomic radius of chlorine results in a less planar conformation of the three phenyl rings, which in turn leads to a reduction of p-orbital overlap. The degree of delocalization of a positive charge on the benzylic position is thereby decreased, which means that the protecting group or linker in question is more difficult to cleave and thus more stable.

Hence, the following row of stability can be defined:

2-chlorotrityl → trityl → 4-methyltrityl → 4-methoxytrityl → 4,4'-dimethoxytrityl

5. Resins and Linkers for the Synthesis of Peptide Amides

5.1. Rink Amide and Knorr Resins

C-Terminal amides are the most common modification in peptides. For their synthesis *via* the Fmoc strategy the Rink amide linker has been developed. The amino group of the Rink linker for amide synthesis is protected with Fmoc (see below), while the corresponding Rink acid linker bears a hydroxyl group instead of the amine (not shown).

Different modifications of the Rink linker have been developed towards varying uses. The standard Rink amide resin is cleaved using 10% TFA in DCM, as higher concentrations of acid can cleave the Rink linker from the polystyrene resin, producing highly colored impurities. The formation of these byproducts can be minimized by adding trialkylsilanes to the cleavage mixture. The Knorr resin avoids this unwanted linker cleavage through the introduction of a more stable acetamide spacer between the Rink linker and the resin.

An additional variant of the Knorr linker is the attachment to an even more acid labile 2CT resin. Through this combination, the protected peptide can be cleaved from the 2CT resin while still carrying the Knorr linker as protecting group for the C-terminus for subsequent modifications using solution phase chemistry. This strategy can be especially useful for synthesizing large peptides *via* ligation that have difficult sequences in the C-terminal region.

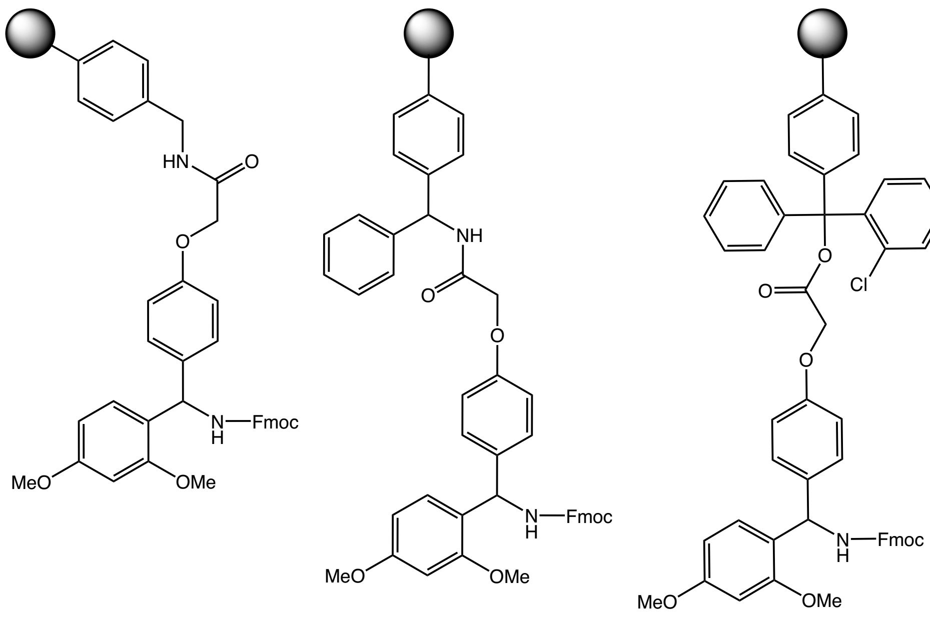

Fig. 27: Rink amide resin and variants thereof.

↑ back to content

Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

Loading amino acids to the Rink amide resins is essentially the same reaction sequence as for standard peptide coupling, with a Fmoc deprotection step followed by the coupling reaction.

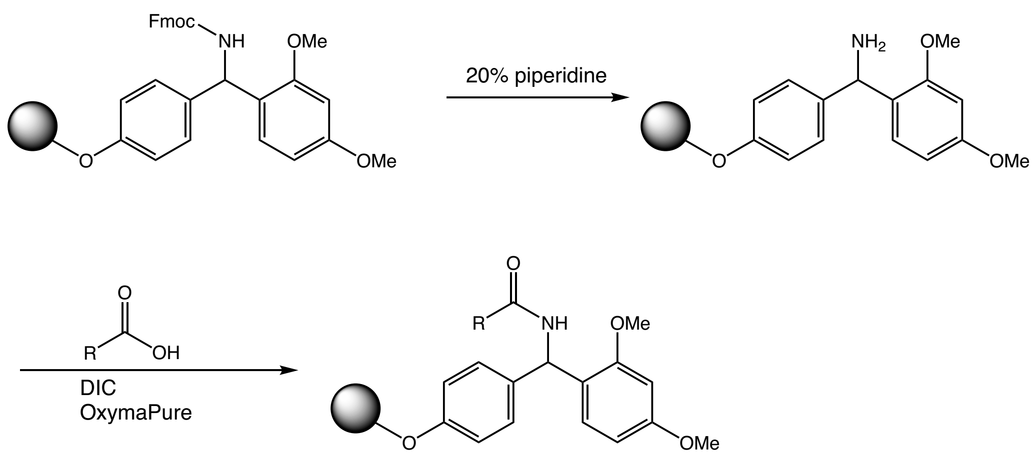

Fig. 28: Loading of Rink resins.

Protocol 7: Attachment of Carboxylic Acids to Rink Amide Linker Resins

I. Swell the resin in DMF using 15 mL solvent per gram of resin.

II. Discard excess liquid and deprotect the Fmoc group from the linker with 15 mL of 20% (v/v) piperidine in DMF for 10 min.

III. Repeat step II with 5 min reaction time.

IV. Discard the piperidine solution and wash 5 times with DMF.

V. Dissolve 1.5 to 2.5 eq. (relative to the reactive sites on the resin) of carboxylic acid in a second vessel with a minimum amount of DMF.

VI. Add the same number of equivalents of OxymaPure and dissolve. If necessary, add more DMF.

VII. Add 1 eq. (relative to the amino acid) of DIC to the vessel with the amino-acid/OxymaPure solution and close the vessel with a drying tube. Let the solution stand at RT for 10 min.

VIII. Add the reaction solution to the resin.

IX. Shake the solution for 2 to 3 h at room temperature.

X. Take a small sample of the resin, wash with DCM and perform a Kaiser test. If free amines are detected, continue with step XI, otherwise with step XII.

XI. Add 1 eq. (relative to the reactive sites on the resin) of acetic anhydride and pyridine to the mixture and shake for 30 min.

XII. Remove solution by filtration and wash the resin 3 times with DMF, 3 times with DCM, and finally 3 times with methanol.

XIII. Dry the resin to constant weight under reduced pressure.

References:

→ *Solid-phase synthesis of protected peptide fragments using a trialkoxy-diphenyl-methylester resin; H. Rink;* ***Tetrahedron Lett.*** *1987;* ***28****: 3787-3790.* *https://doi.org/10.1016/s0040-4039(00)96384-6*

→ *Preparation of protected peptide amides using the Fmoc chemical protocol. Comparison of resins for solid phase synthesis; S. C. Story, J. V. Aldrich;* ***Int J Pept Protein Res*** *1992;* ***39****: 87-92.* *https://doi.org/10.1111/j.1399-3011.1992.tb01560.x*

→ *A comparison of acid labile linkage agents for the synthesis of peptide C-terminal amides; M. S. Bernatowicz, S. B. Daniels, H. Köster;* ***Tetrahedron Lett.*** *1989;* ***30****: 4645-4648.* *https://doi.org/10.1016/s0040-4039(01)80764-4*

5.2. Sieber Resin

The Sieber amide resin is ideally suited to synthesize side-chain protected peptide amides, as cleavage occurs in 1% TFA in DCM. Since the Sieber linker is less bulky through the fixation of the two aryl rings *via* the phenolether bridge, it is better suited for the synthesis of C-terminal secondary amides.

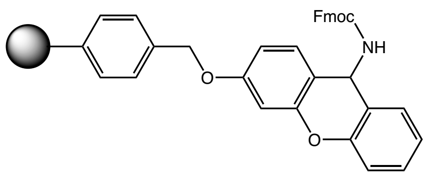

Fig. 29: Sieber amide resin.

A protocol similar to the Rink amide resin loading protocol 7 (chapter 5.1 *Protocol 7: Attachment of Carboxylic Acids to Rink Amide Linker Resins on page 33*) can be employed to attach the first amino acid to the solid support.

References:

→ *A new acid-labile anchor group for the solid-phase synthesis of C-terminal peptide amides by the Fmoc method; P. Sieber;* ***Tetrahedron Lett.*** *1987;* ***28****: 2107-2110.* *https://doi.org/10.1016/s0040-4039(00)96055-6*

→ *Reductive alkylation of 9-amino-xanthen-3-yloxymethylpoly(styrene): a novel procedure for the synthesis of peptidyl N-alkyl amides by Fmoc/But chemistry; W. C. Chan, S. L. Mellor;* ***J. Chem. Soc. Chem. Commun.*** *1995; 1475-1477.* *https://doi.org/10.1039/c39950001475*

A protocol for greener cleavage of protected peptide fragments from Sieber Amide Resin proposes the use of 2% (v/v) TFA in either toluene or *p*-xylene.

Reference:

→ *Greener Cleavage of Protected Peptide Fragments from Sieber Amide Resin; O. Al Musaimi, V. Gavva, D. R. Williams;* ***ChemistryOpen*** *2022;* ***11****: e202200236.* *https://doi.org/10.1002/open.202200236*

↑ back to content

5.3. Peptide Amides Synthesis by Side-chain Immobilization

As an alternative to using linker chemistry to generate C-terminal amides, if the first amino acid to be attached to the solid support bears a side-chain with a suitable functional group (such as an OH-group), the carboxamide of this amino acid can be attached to the resin *via* its side-chain. The peptide chain can then be extended through standard SPPS to generate the desired peptide amide (*Fig. 30*). Many amino acids and peptides as well as preloaded resins are commercially available for fast and easy access.

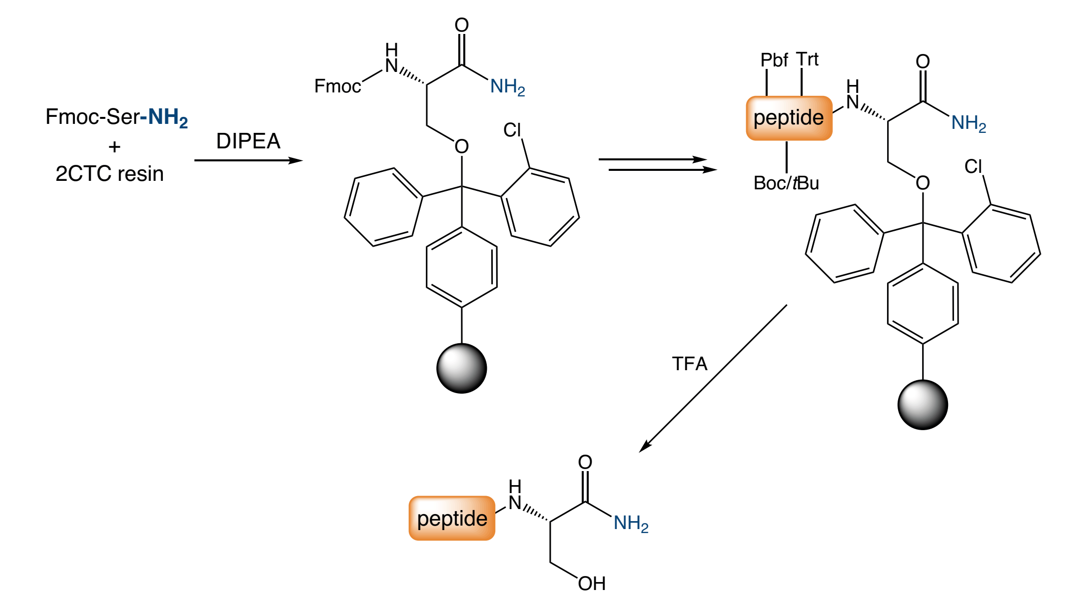

Fig. 30: Example of an alternative way of synthesizing peptide amides by attaching a peptide amide to the solid support (e.g., to a 2CTC resin) via the side-chain; said amide is subsequently extended by SPPS.

6. Hydrazone Resins

Peptide hydrazides can be easily synthesized using the novel hydrazone resin. The hydrazone linker is completely stable in the course of standard Fmoc SPPS, and tolerates treatment with 5% TFA/DCM, thus permitting selective removal of Mtt or similar acid-labile protecting groups. Subsequent application of tried and tested cleavage cocktails (TFA:water:TIS 95:2.5:2.5) permits to obtain the peptides in good yields and purities.

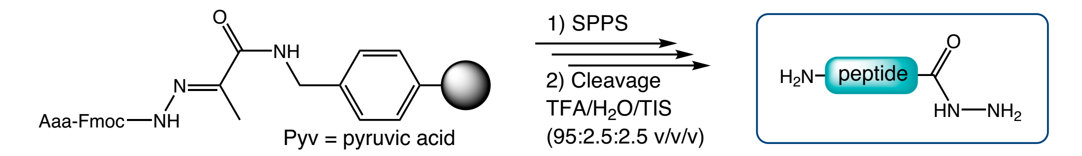

Fig. 31: SPPS on hydrazone resins yielding a peptide hydrazide.

Synthesized peptide hydrazides can be applied as building blocks for the conjugation to different carrier molecules using the hydrazone ligation technique or be converted to peptide thioesters that may be used in native chemical ligation (NCL).

Protocol 8: Attachment of Carboxylic Acids to Hydrazone Resin

Method 1.

I. Place the Fmoc-NHN=Pyv resin in a clean dry reaction vessel, add sufficient DMF and allow to swell for 1 h.

II. Wash the resin with DMF and treat with 20% piperidine in DMF (1x2 min; 1x8 min) to remove the Fmoc group. Wash with DMF (2x1 min); iPrOH (2x1 min) and DMF (3x1 min).

III. Dissolve the Fmoc amino acid (4 eq.) and OxymaPure (4 eq.) in DMF while stirring at room temperature and cool to 0 °C in an ice bath. Add DIC (4 eq.) and stir the reaction mixture for 10 min.

IV. Transfer the solution of the activated Fmoc amino acid to the reaction vessel containing the resin. Stir for 60 min and leave overnight. Wash the resin with DMF (3x1 min).

V. Perform the Fmoc loading test. If necessary, repeat steps III and IV.

Method 2.

I. Place the Fmoc-NHN=Pyv resin in a clean dry reaction vessel, add sufficient DMF and allow to swell for 1 h.

II. Wash the resin with DMF and treat with 20% piperidine in DMF (1x2 min; 1x8 min) to remove the Fmoc group. Wash with DMF (2x1 min); iPrOH (2x1 min) and DMF (3x1 min).

III. Dissolve the Fmoc amino acid (4 eq.) and PyAOP (4 eq.) in DMF while stirring at room temperature, add DIEA (8 eq.) and stir the reaction mixture for 8 min.

IV. Transfer the solution of the activated Fmoc amino acid to the reaction vessel containing the resin. Stir for 60 min and leave overnight. Wash the resin with DMF (3x1 min).

V. Perform the Fmoc loading test. If necessary, repeat steps III and IV.

Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

↑ back to content

Important notes:

- It is advised to use anhydrous solvents and a dry reaction vessel.
- The formation of truncated peptide sequences was not observed so far, however the residual hydrazone groups can be capped using a mixture of Ac_2O/DIEA/DCM.
- Method 2 is not suitable in the case of serine and cysteine due to the partial racemization.

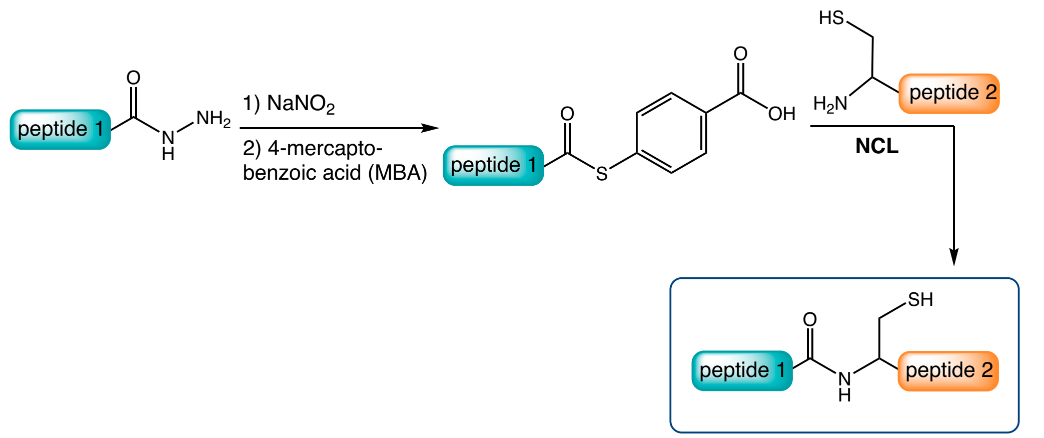

Fig. 32: Native Chemical Ligation utilizing C-terminal thioesters synthesized from peptide hydrazides.

Reference:

→ *Convenient method of peptide hydrazide synthesis using a new hydrazone resin; P. S. Chelushkin, K. V. Polyanichko, M. V. Leko, M. Y. Dorosh, T. Bruckdorfer, S. V. Burov;* ***Tetrahedron Lett.*** *2015;* ***56****: 619-622.*
https://doi.org/10.1016/j.tetlet.2014.12.056

Lysine Dendrons – easily accessible *via* Hydrazone Resin

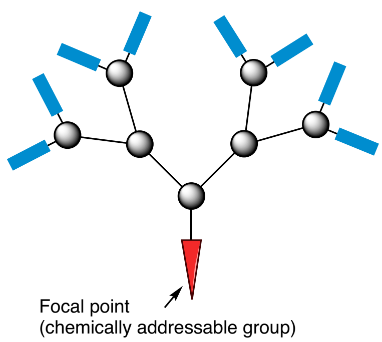

Fig. 33: Schematic illustration of lysine dendrons.

Lysine dendrons with a hydrazide functional group at the focal point/C-terminus can undergo chemo-selective conjugation with synthetic or natural polymers or molecules bearing aldehyde groups (in peptides for example by oxidation of N-terminal serine or threonine residues). The conjugation can be performed with (or without) subsequent reduction of the hydrazone bond by $NaBH_4$. Conjugates then can for example be applied for the design of gene delivery systems or for modifying the surface properties of polymers.

DOTA-functionalized dendrons conjugated to peptide or polymer carrier molecules facilitate delivery of paramagnetic ions (Gd^{3+}; Mn^{2+}) or radioactive isotopes. Applications include the targeted delivery of MR contrast agents (e.g., Gd^{3+}) and radio immunotherapy.

The triphenylphosphonium (TPP)-bearing dendron was designed for the targeted delivery of peptides, polymers, and different drugs to mitochondria.

References:

- *A dendronized heparin–gadolinium polymer self-assembled into a nanoscale system as a potential magnetic resonance imaging contrast agent; C. Guo, L. Sun, W. She, N. Li, L. Jiang, K. Luo, Q. Gong, Z. Gu;* ***Polym. Chem.*** *2016; 7: 2531-2541.* https://doi.org/10.1039/c6py00059b
- *Effect of the Conjugation Density of Triphenylphosphonium Cation on the Mitochondrial Targeting of Poly(amidoamine) Dendrimers; E. R. Bielski, Q. Zhong, M. Brown, S. R. da Rocha;* ***Mol. Pharm.*** *2015; 12: 3043-53.* https://doi.org/10.1021/acs.molpharmaceut.5b00320
- *Mitochondrial targeting dendrimer allows efficient and safe gene delivery; X. Wang, N. Shao, Q. Zhang, Y. Cheng;* ***J. Mater. Chem. B*** *2014; 2: 2546-2553.* https://doi.org/10.1039/c3tb21348j
- *A hydrazide-anchored dendron scaffold for chemoselective ligation strategies; L. O'Donovan, P. A. De Bank;* ***Org Biomol Chem*** *2014; 12: 7290-6.* https://doi.org/10.1039/c4ob00870g
- *Peptide targeted tripod macrocyclic Gd(III) chelates for cancer molecular MRI; Z. Zhou, X. Wu, A. Kresak, M. Griswold, Z. R. Lu;* ***Biomaterials*** *2013; 34: 7683-93.* https://doi.org/10.1016/j.biomaterials.2013.06.057
- *Synthesis and evaluation of a peptide targeted small molecular Gd-DOTA monoamide conjugate for MR molecular imaging of prostate cancer; X. Wu, S. M. Burden-Gulley, G. P. Yu, M. Tan, D. Lindner, S. M. Brady-Kalnay, Z. R. Lu;* ***Bioconjug Chem*** *2012; 23: 1548-56.* https://doi.org/10.1021/bc300009t
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- *Surface conjugation of triphenylphosphonium to target poly(amidoamine) dendrimers to mitochondria; S. Biswas, N. S. Dodwadkar, A. Piroyan, V. P. Torchilin;* ***Biomaterials*** *2012; 33: 4773-82.* https://doi.org/10.1016/j.biomaterials.2012.03.032
- *Multiple triphenylphosphonium cations as a platform for the delivery of a pro-apoptotic peptide; N. Kolevzon, U. Kuflik, M. Shmuel, S. Benhamron, I. Ringel, E. Yavin;* ***Pharm Res*** *2011; 28: 2780-9.* https://doi.org/10.1007/s11095-011-0494-6
- *MRI detection of VEGFR2 in vivo using a low molecular weight peptoid-(Gd)8-dendron for targeting; L. M. De Leon-Rodriguez, A. Lubag, D. G. Udugamasooriya, B. Proneth, R. A. Brekken, X. Sun, T. Kodadek, A. Dean Sherry;* ***J Am Chem Soc*** *2010; 132: 12829-31.* https://doi.org/10.1021/ja105563a
- *Multiple triphenylphosphonium cations shuttle a hydrophilic peptide into mitochondria; S. E. Abu-Gosh, N. Kolvazon, B. Tirosh, I. Ringel, E. Yavin;* ***Mol. pharm.*** *2009; 6: 1138-44.* https://doi.org/10.1021/mp900032r
- *Inhibition of mitosis by glycopeptide dendrimer conjugates of colchicine; D. Lagnoux, T. Darbre, M. L. Schmitz, J. L. Reymond;* ***Chemistry*** *2005; 11: 3941-50.* https://doi.org/10.1002/chem.200401294
- *Synthesis and Application of Peptide Dendrimers As Protein Mimetics; J. P. Tam, J. C. Spetzler; in Current Protocols in Immunology; edited by John Wiley & Sons, Inc.; 2001.* https://doi.org/10.1002/0471142735.im0906s34
- *Assembly of cyclic peptide dendrimers from unprotected linear building blocks in aqueous solution; T. D. Pallin, J. P. Tam;* ***Chem. Commun.*** *1996; 1345-1346.* https://doi.org/10.1039/cc9960001345

↑ back to content

7. Scavenger Resins

In contrast to the solid supports previously discussed, the special resins in this chapter are not used to attach and modify molecules on solid support. Instead, these resins bear immobilized reagents that can be easily filtered off from the products after completion of the desired chemical transformation.

Scavenger resins are functionalized solid supports that are used for the rapid inactivation of reactive side products generated during solution phase chemistry. There is a wide variety of functional groups available on different resins that will react with various by-products to remove them from the reaction solution.

Scavenger resins have become increasingly popular in solution phase combinatorial synthesis for active pharmaceutical ingredients. In comparison to other purification methods, scavenger resins have several advantages:

- Quick purification by easy and fast separation through filtration.
- Can be used in excess to capture impurities more efficiently and faster.
- Product stays in solution and can be subjected to further reactions without prior work-up.
- Compatible with a wide variety of solvents.
- Orthogonal purification principle that can be combined with other methods.

Example: Reductive Amination and Excess Amine Removal

The following two-step procedure nicely demonstrates the application of solid-supported reagents and scavenger resins. Reductive amination often requires an excess of amine. The reducing borane reagent is immobilized by ionic interaction on a positively charged ammonium resin that can be easily filtered off once the reduction is completed. The excess of amine can then be removed by imine formation with an aldehyde resin and subsequent filtration (*Fig. 34*).

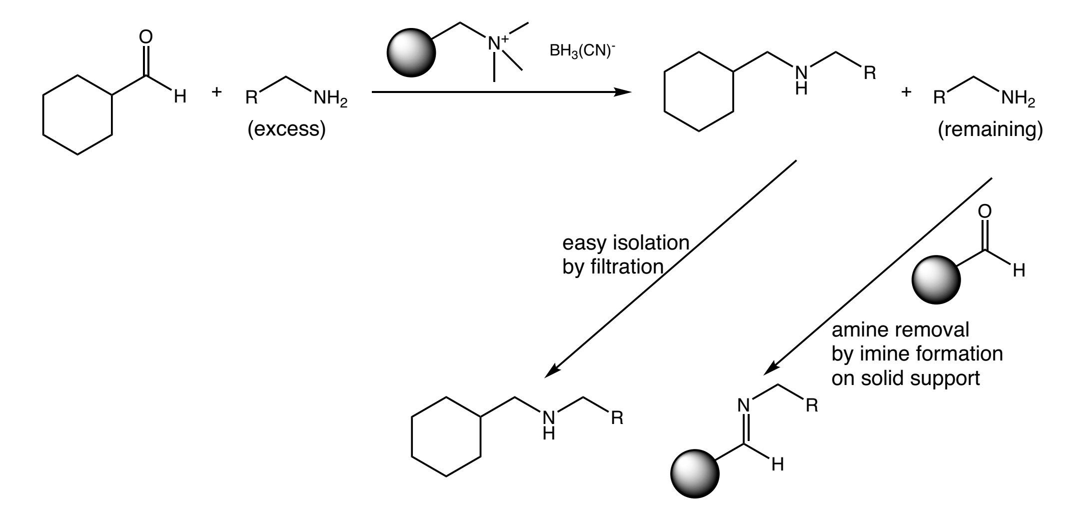


Fig. 34: Reductive amination and subsequent facile purification using two different scavenger resins.

Aldehyde resins have a significant advantage over other amine scavengers, such as isocyanate resins, as they are fully capable to distinguish between primary and secondary amines.

8. Standard Protocols for Peptide Synthesis

Protocol 9: Fmoc Deprotection (Fmoc Strategy)

I. Swell the resin in DMF using 10 mL solvent per gram of resin.

II. Discard excess liquid, and deprotect Fmoc group by adding 10 mL of 20% (v/v) piperidine in DMF per gram of resin, and agitating the resin for 10 min.

III. Repeat step II with 5 min reaction time.

IV. Discard the piperidine solution and wash 5 times with DMF.

Protocol 10: Boc Deprotection (Boc Strategy)

I. Swell the resin in DCM using 10 mL solvent per gram of resin.

II. Discard excess liquid and deprotect Boc group by adding 10 mL of 50% (v/v) TFA in DCM per gram of resin and agitating for 5 min. Add 0.5% DTT when Cys, Met or Trp are present in the peptide.

III. Repeat step II with 20 min reaction time.

IV. Discard the TFA solution and wash 2 times with DCM and subsequently 2 times with IPA before neutralization.

Protocol 11: Neutralization after Boc Deprotection (Boc Strategy)

I. Treat resin with 10 mL of 10% (v/v) TEA in DCM per gram resin for 10 min.

II. Discard liquid and repeat step I.

III. Wash the resin 3 times alternatingly with DCM and IPA each.

Protocol 12: Standard Amino Acid Coupling

I. Dissolve 2 eq. (relative to resin loading) of carboxylic acid, COMU and OxymaPure in a vessel with 10 mL of DMF per gram of resin.

II. Add 1 eq. (relative to the amino acid) of DIEA to the vessel with the amino-acid solution and mix.

III. Add the reaction solution to the swollen resin and shake the solution for 1 h at room temperature.

IV. Remove solution by filtration and wash the resin 5 times with DMF.

Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

↑ back to content

Protocol 13: Difficult Amino Acid Coupling

Numerous protocols have been published for achieving good yields while coupling sterically hindered amino acids, such as Aib or other difficult carboxylic acids using reagents like HATU and/or HOAt. These reagents recently have been classified as explosives and hence cannot be used anymore by the peptide community.

I. Dissolve 2 eq. (relative to resin loading) of carboxylic acid, HDMA and OxymaPure in a vessel with 10 mL of DMF per gram of resin.

II. Add 1 eq. (relative to the amino acid) of DIPEA to the vessel with the amino-acid solution and mix.

III. Add the reaction solution to the swollen resin and shake the solution for 3 h at room temperature.

IV. Remove solution by filtration and wash the resin 5 times with DMF.

Modern substitutes are:

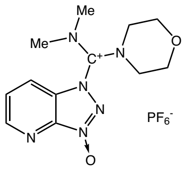
Substitute for HATU:

Product details

RL-2170 HDMA

1-[(Dimethylamino)(morpholino)methylene]-1H-[1,2,3]triazolo[4,5-b]pyridine-1-ium 3-oxide hexafluorophosphate

CAS-No.	958029-37-3
Formula	$C_{12}H_{17}N_6O_2*PF_6$
Mol. weight	277,30*144,96 g/mol



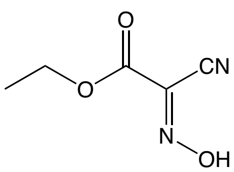
Substitute for HOAt:

Product details

RL-1180 OxymaPure

Ethyl cyano(hydroxyimino)acetate, Ethyl cyanoglyoxylate-2-oxime

CAS-No.	3849-21-6
Formula	$C_5H_6N_2O_3$
Mol. weight	142,11 g/mol



Protocol 14: TFA Peptide Cleavage (Fmoc Strategy), High Concentration

I. Add 20 mL of a TFA, water and TIPS mixture (95/2.5/2.5; v:v:v) to the dry resin and react for 2 h.

II. Separate cleavage cocktail from resin *via* filtration.

III. Reduce volume of cleavage cocktail to approximately 10% of original volume.

IV. Add 10 volumes of ice-cold diethyl ether (relative to remaining volume of cleavage cocktail) to precipitate the peptide.

V. Decant diethyl ether or filter off the precipitate.

VI. Wash 2 times with diethyl ether and dry peptide.

Protocol 15: Dilute TFA Peptide Cleavage (Fmoc Strategy)

Fully side-chain protected peptides will be generated with highly acid-sensitive resins like 2-chlorotrityl resin, trityl-TentaGel® or Sieber resins. Due to the high acid sensitivity of the peptide-resin bond and the hydrophobic nature of the cleaved, fully protected peptide, careful prior experimentation is necessary, and appropriate minor modifications of the protocol given below may be required.

I. Swell the resin in DCM using 10 mL solvent per gram of resin and discard excess of liquid.

II. Add 10 mL of a 1% TFA and 1% EDT in DCM, seal the container and shake for 2 min.

III. Filter the solution by applying gravity or nitrogen pressure (no vacuum!) into a flask containing 10% pyridine in MeOH (v/v 2 mL per 10 mL cleavage solution).

IV. Repeat from step II 10 times.

V. Add 10 volumes of ice-cold diethyl ether (relative to remaining volume of cleavage cocktail) to precipitate the peptide.

VI. Decant diethyl ether or filter off the precipitate.

VII. Wash 2 times with diethyl ether and dry peptide.

Protocol 16: Low-High HF Peptide Cleavage (Boc Strategy)

I. A solution of DMS/*p*-cresol (65:10; v/v) (*p*-thiocresol if Trp(For) is present) is added to the reactor with the resin.

II. Distill HF into the reactor until the solution reaches a HF/DMS/*p*-cresol ratio of 25:65:10 (v/v/v) with 10 mL solution per gram resin.

III. Agitate for 2 h at 0-5 °C.

IV. Evaporate HF and DMS under reduced pressure.

V. Remove the resin from the reactor and wash with DCM.

VI. Return the resin to the reactor with *p*-cresol.

VII. Perform high HF cleavage for 1 h at 0-5 °C in a mixture of HF/*p*-cresol of 9:1 (v/v).

VIII. Remove HF under reduced pressure.

IX. Suspend the cleaved peptide and resin in diethyl ether and wash thoroughly with diethyl ether.

X. Remove ether by drying.

XI. Dissolve the peptide in 50% aqueous acetic acid, filter off resin and dilute peptide solution with water.

XII. Recover the peptide by lyophilization or use solution directly for HPLC purification.

Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

↑ back to content

9. Product Catalogue

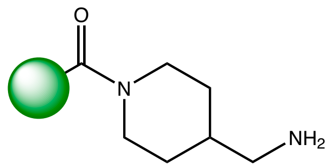
9.1. Base Resins

Product details

BR-1045 Amino-Li Resin

Aminomethyl-poly(acryl amide) resin

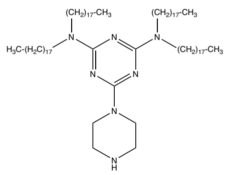
Mesh Size	45-55 mesh
Loading	0,4-0,6 mmol/g



CC-1000 Cyclover-Amine

N2,N2,N4,N4-tetraoctadecyl-6-(1-piperazinyl)1,3,5-triazine-2,4-diamine

CAS-No.	3018086-90-0
Formula	$C_{79}H_{157}N_7$
Mol. weight	1205,17 g/mol



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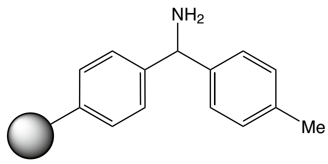
9.1.1. Benzhydryl/Benzophenon Type Resins

Product details

BR-1120 MBHA-Resin

4-Methylbenzhydrylamine Resin

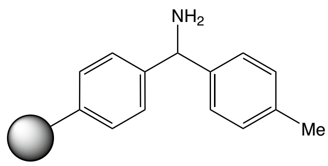
Mesh Size	100-200 mesh
Loading	0.5-1.5 mmol/g
DVB	1% DVB



BR-1125 MBHA-Resin

4-Methylbenzhydrylamine Resin

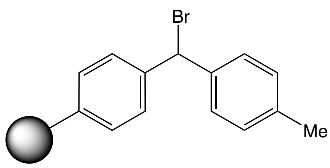
Mesh Size	200-400 mesh
Loading	0.5-1.5 mmol/g
DVB	1% DVB



BR-1180 MBH-Br Resin

4-Methylbenzhydryl bromide resin

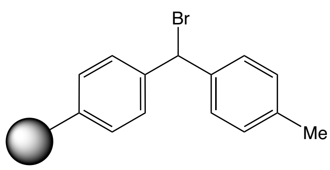
Mesh Size	100-200 mesh
Loading	1.2-2.0 mmol/g
DVB	1% DVB



BR-1185 MBH-Br Resin

4-Methylbenzhydryl bromide resin

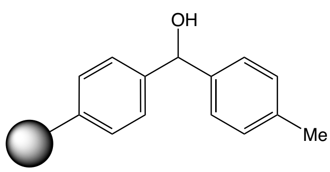
Mesh Size	200-400 mesh
Loading	1.2-2.0 mmol/g
DVB	1% DVB



BR-1190 4-Me-BH-OH Resin

4-Methylbenzhydryl-alcohol resin

Mesh Size	100-200 mesh
Loading	1.2-2.0 mmol/g
DVB	1% DVB

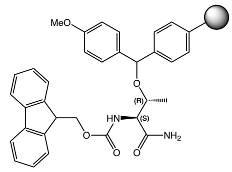


↑ back to content

Product details

RAA2680 Fmoc-L-Thr(MeO-BH resin)-NH_2

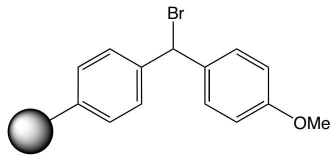
Fmoc-L-Threonine alpha-amide-O-(4-methoxybenzhydryl resin)



Mesh Size	100-200 mesh
Loading	ca. 0.5 mmol/g
DVB	1% DVB

BR-1030 4-MeO-BH-Br Resin

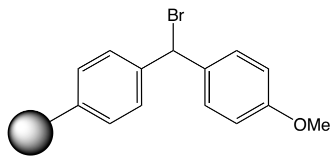
4-Methoxybenzhydryl bromide resin



Mesh Size	100-200 mesh
Loading	1.0-2.0 mmol/g
DVB	1% DVB

BR-1035 4-MeO-BH-Br Resin

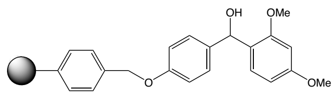
4-Methoxybenzhydryl bromide resin



Mesh Size	200-400 mesh
Loading	1.0-2.0 mmol/g
DVB	1% DVB

BR-5088 Rink Acid Resin

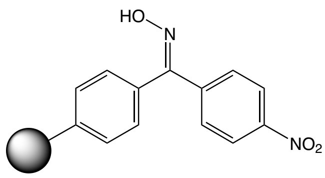
Rink Polystyrene Resin



Mesh Size	100-200 mesh
Loading	0.5-1.3 mmol/g
DVB	1% DVB

BR-5076 Oxime Resin

p-Nitrobenzhydryl oxime polystyrene



Mesh Size	100-200 mesh
Loading	0.5-1.5 mmol/g
DVB	1% DVB

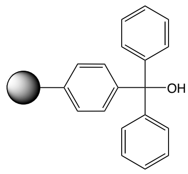
9.1.2. Trityl Type Base Resins

Product details

BR-1150 Trt-OH Resin

Trityl alcohol resin

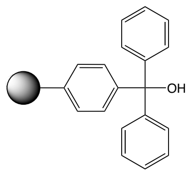
Mesh Size	100-200 mesh
Loading	1.2-2.0 mmol/g
DVB	1% DVB



BR-1155 Trt-OH Resin

Trityl alcohol resin

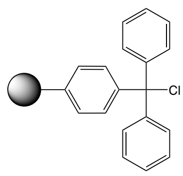
Mesh Size	200-400 mesh
Loading	1.2-2.0 mmol/g
DVB	1% DVB



BR-1140 Trt-Cl Resin

Trityl chloride resin

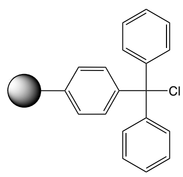
Mesh Size	100-200 mesh
Loading	1.0-2.0 mmol/g
DVB	1% DVB



BR-1145 Trt-Cl Resin

Trityl chloride resin

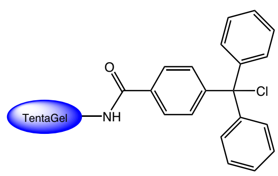
Mesh Size	200-400 mesh
Loading	1.2-2.0 mmol/g
DVB	1% DVB



S-30031 TG S Trt-Cl (90µm)

Chlorotrityl-TentaGel S

Mesh Size	90 µm
Loading	0.15 - 0.3 mmol/g



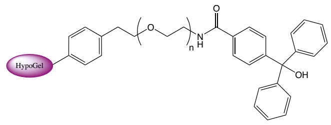
↑ back to content

Product details

BRH1140 HypoGel® 200 Trt-OH

HypoGel-PEG200-trityl alcohol (n=5)

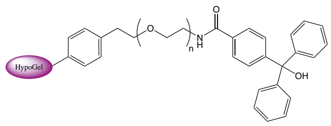
Mesh Size 110-150 µm
Loading 0.6-0.8 mmol/g



BRH1260 HypoGel® 400 Trt-OH

HypoGel-PEG400-trityl alcohol (n=10)

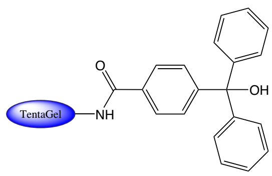
Mesh Size 110-150 µm
Loading 0.4-0.6 mmol/g



S-30012 TG S Trt-OH (90µm)

TentaGel S Trt-OH

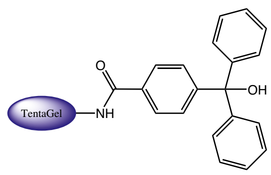
Mesh Size 90 µm
Loading 0.2-0.3 mmol/g



HL12012 TG HL Trt-OH (75µm)

TentaGel HL Trt-OH (75µm)

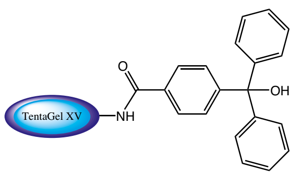
Loading 0.3-0.5 mmol/g



XV30012 TG XV Trt-OH (100µm)

Hydroxytrityl-TentaGel XV

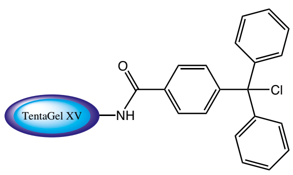
Mesh Size 100-200 µm
Loading 0.2-0.4 mmol/g



XV30031 TG XV Trt-Cl (100µm)

Chlorotrityl-TentaGel XV

Mesh Size 100-200 µm
Loading 0.2-0.4 mmol/g

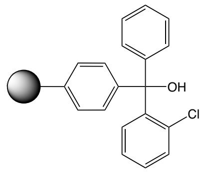


Product details

BR-1170 2CT-OH Resin

2-Chlorotrityl alcohol resin

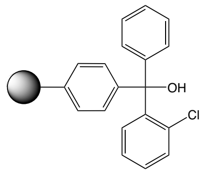
Mesh Size	100-200 mesh
Loading	1.2-2.5 mmol/g
DVB	1% DVB



BR-1175 2CT-OH Resin

2-Chlorotrityl alcohol resin

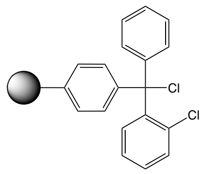
Mesh Size	200-400 mesh
Loading	1.2-2.0 mmol/g
DVB	1% DVB



BR-1055 2CTC Resin

2-Chlorotrityl chloride resin

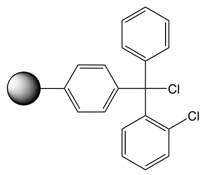
CAS-No.	934816-82-7
Mesh Size	50-100 mesh
Loading	1.0-1.6 mmol/g
DVB	1% DVB



BR-1060LL 2CTC Resin

2-Chlorotrityl chloride resin

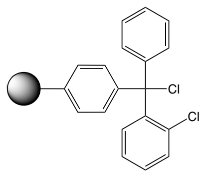
CAS-No.	934816-82-7
Mesh Size	100-200 mesh
Loading	0.1-0.9 mmol/g
DVB	1% DVB



BR-1060 2CTC Resin

2-Chlorotrityl chloride resin

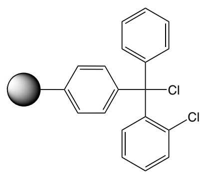
CAS-No.	934816-82-7
Mesh Size	100-200 mesh
Loading	1.0-1.6 mmol/g
DVB	1% DVB



BR-1065 2CTC Resin

2-Chlorotrityl chloride resin

CAS-No.	934816-82-7
Mesh Size	200-400 mesh
Loading	1.1-1.8 mmol/g
DVB	1% DVB



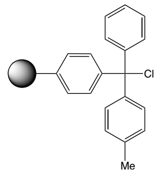
↑ back to content

Product details

BR-1130 Mtt-Cl Resin

4-Methyltrityl chloride resin

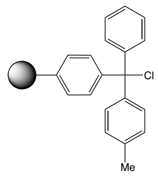
Mesh Size	100-200 mesh
Loading	0.5-2.0 mmol/g
DVB	1% DVB



BR-1135 Mtt-Cl Resin

4-Methyltrityl chloride resin

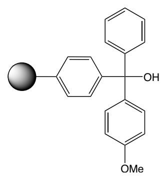
Mesh Size	200-400 mesh
Loading	0.5-2.0 mmol/g
DVB	1% DVB



BR-1160 Mmt-OH Resin

4-Methoxytrityl alcohol resin

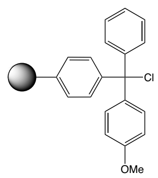
Mesh Size	100-200 mesh
Loading	1.2-2.0 mmol/g
DVB	1% DVB



BR-1110 Mmt-Cl Resin

4-Methoxytrityl chloride resin

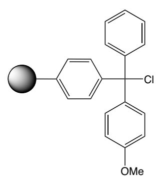
Mesh Size	100-200 mesh
Loading	1.0-2.0 mmol/g
DVB	1% DVB



BR-1115 Mmt-Cl Resin

4-Methoxytrityl chloride resin

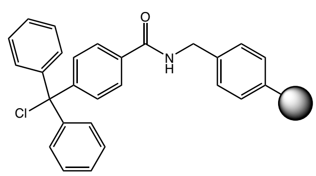
Mesh Size	200-400 mesh
Loading	1.2-2.0 mmol/g
DVB	1% DVB



BR-2010 TCP Resin

Tritylchloride-Polystyrene

Mesh Size	200-400 mesh
Loading	0.9-1.0 mmol/g
DVB	1% DVB

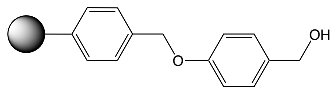


9.1.3. Wang and other Benzylalcohol Basis Resins

Product details

BR-5098 Wang Resin

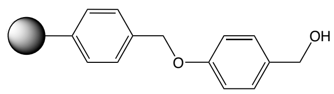
4-Benzyloxybenzyl alcohol polystyrene



CAS-No.	65307-53-1
Mesh Size	100-200 mesh
Loading	0.4-1.0 mmol/g
DVB	1% DVB

BR-5244 Wang Resin

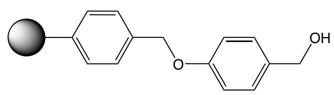
4-Benzyloxybenzyl alcohol polystyrene



CAS-No.	65307-53-1
Mesh Size	100-200 mesh
Loading	1.0-2.0 mmol/g
DVB	1% DVB

BR-5245 Wang Resin

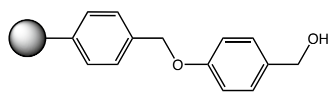
4-Benzyloxybenzyl alcohol polystyrene



CAS-No.	65307-53-1
Mesh Size	200-400 mesh
Loading	0.4-1.0 mmol/g
DVB	1% DVB

BR-1420 Wang Resin

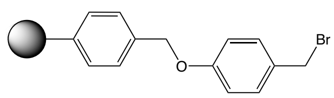
4-Benzyloxybenzyl alcohol polystyrene



CAS-No.	65307-53-1
Mesh Size	200-400 mesh
Loading	1.0-2.0 mmol/g
DVB	1% DVB

BR-5216 Wang-Br Resin

4-Benzyloxybenzyl bromide polystyrene



Mesh Size	100-200 mesh
Loading	0.5-1.3 mmol/g
DVB	1% DVB

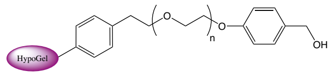
↑ back to content

Product details

BRH1150 HypoGel® 200 Wang

HypoGel-PEG200-*p*-Hydroxybenzyl alcohol (n=5)

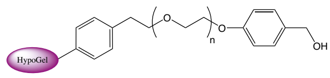
Mesh Size	110-150 µm
Loading	0.6-0.9 mmol/g



BRH1270 HypoGel® 400 Wang

HypoGel-PEG400-*p*-Hydroxybenzyl alcohol (n=10)

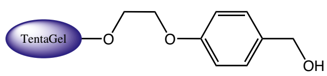
Mesh Size	110-150 µm
Loading	0.5-0.8 mmol/g



R28013 TG R Wang (90µm)

TentaGel R PHB (90µm)

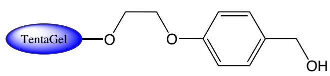
Loading	0.18-0.23 mmol/g



S-30013 TG S Wang (90µm)

TentaGel S PHB

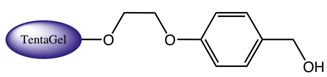
Mesh Size	90 µm
Loading	0.2-0.3 mmol/g



HL12013 TG HL Wang (75µm)

TentaGel HL PHB (75µm)

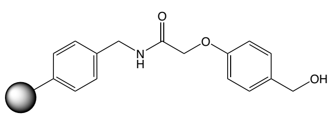
Loading	0.3-0.5 mmol/g



BR-5068 HMPA Resin

4-(Hydroxymethyl)phenoxyacetyl amidomethylpolystyrene resin

Mesh Size	100-200 mesh
Loading	0.6-1.2 mmol/g
DVB	1% DVB

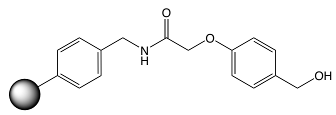


Product details

BR-5250 HMPA Resin

4-(Hydroxymethyl)phenoxyacetyl amidomethylpolystyrene resin

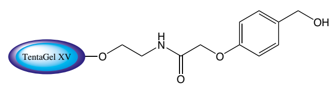
Mesh Size	200-400 mesh
Loading	0.6-1.2 mmol/g
DVB	1% DVB



XV30015 TG XV HMPA (100µm)

4-Hydroxymethyl-phenoxyacetamido-TentaGel XV

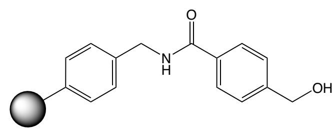
Mesh Size	100-200 µm
Loading	0.15-0.35 mmol/g



BR-5066 HMBA-AM Resin

4-(Hydroxymethyl)benzoyl-aminomethyl polystyrene

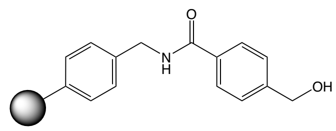
Mesh Size	100-200 mesh
Loading	0.5-1.0 mmol/g
DVB	1% DVB



BR-5249 HMBA-AM Resin

4-(Hydroxymethyl)benzoyl-aminomethyl polystyrene

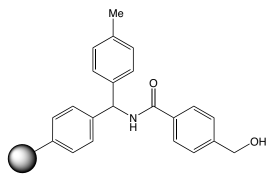
Mesh Size	200-400 mesh
Loading	0.5-1.0 mmol/g
DVB	1% DVB



BR-5207 HMBA-MBHA Resin

4-(Hydroxymethyl)benzoyl-4-methylbenzhydrylamide resin

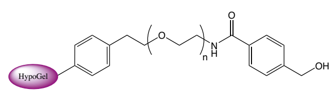
Mesh Size	100-200 mesh
Loading	0.5-1.5 mmol/g
DVB	1% DVB



BRH1100 HypoGel® 200 HMBA

Hydroxymethylbenzoylamide-PEG200-HypoGel (n=5)

Mesh Size	110-150 µm
Loading	0.5-0.8 mmol/g



Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

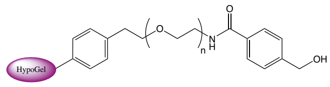
↑ back to content

Product details

BRH1220 HypoGel® 400 HMBA

Hydroxymethylbenzoylamide-PEG400-HypoGel (n=10)

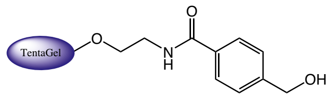
Mesh Size	110-150 µm
Loading	0.4-0.7 mmol/g



R28014 TG R HMBA (90µm)

TentaGel R 4-(hydroxymethyl)benzoyl amide

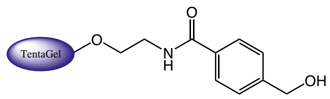
Mesh Size	90 µm
Loading	0.18-0.22 mmol/g



S-30014 TG S HMBA (90µm)

TentaGel S 4-(hydroxymethyl)benzoyl amide

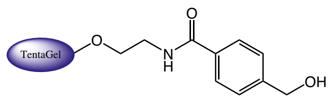
Mesh Size	90 µm
Loading	0.2-0.28 mmol/g



HL12014 TG HL HMBA (75µm)

TentaGel HL 4-(hydroxymethyl)benzoyl amide

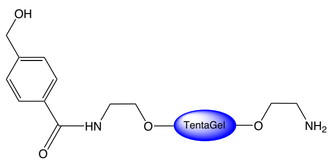
Mesh Size	75 µm
Loading	0.3-0.5 mmol/g



B3013214 TG B HMB/NH_2 (130 µm)

TentaGel B HMB/NH_2 (130 µm)

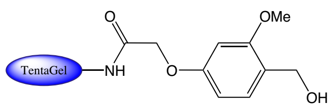
Mesh Size	130 µm
Loading	see description



S-30011 TG S AC (90µm)

TentaGel S AC

Mesh Size	90 µm
Loading	0.2-0.3 mmol/g

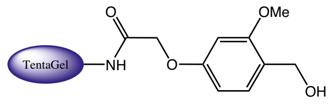


Product details

HL12011 **TG HL AC (75µm)**

TentaGel HL AC (75µm)

Loading 0.3-0.5 mmol/g



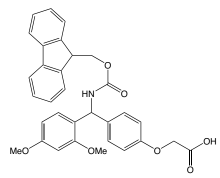
9.1.4. Resins for the Synthesis of Peptide Amides

Product details

RL-1027 **Fmoc-Rink Amide-Linker**

4'-{(R,S)-alpha-[1-(9-Fluorenyl)methoxycarbonyla-mino]-2,4-dimethoxybenzyl}-phenoxyacetic acid

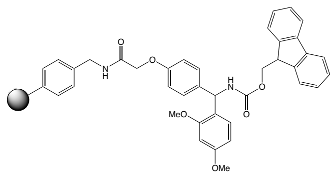
CAS-No.	126828-35-1
Formula	$C_{32}H_{29}NO_7$
Mol. weight	539,58 g/mol



BR-1320 **Fmoc-Rink-Amide AM resin**

Fmoc-Rink Amide aminomethyl-polystyrene Resin

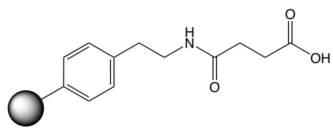
CAS-No.	183599-10-2
Mesh Size	100-200 mesh
Loading	< 0.4 mmol/g
DVB	1% DVB



BR-5251 **Polystyrene-AE-COOH**

Aminoethyl-succinamic acid polystyrene

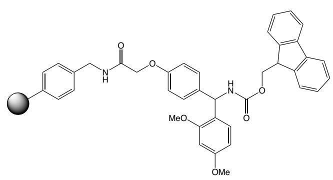
Mesh Size	100-200 mesh
Loading	0.6-1.2 mmol/g
DVB	1% DVB



BR-1330 **Fmoc-Rink Amide AM resin**

Fmoc-Rink Amide aminomethyl-polystyrene Resin

CAS-No.	183599-10-2
Mesh Size	100-200 mesh
Loading	0.4-1.0 mmol/g
DVB	1% DVB



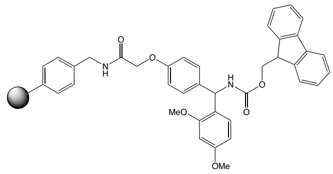
↑ back to content

Product details

BR-1340 Fmoc-Rink-Amide AM resin

Fmoc-Rink Amide aminomethyl-polystyrene Resin

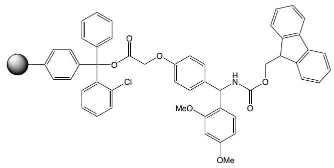
CAS-No.	183599-10-2
Mesh Size	200-400 mesh
Loading	0.4-1.0 mmol/g
DVB	1% DVB



BR-1310 Fmoc-Rink-Amide-2CT resin

Fmoc-Rink Amide 2-chlorotrityl Resin

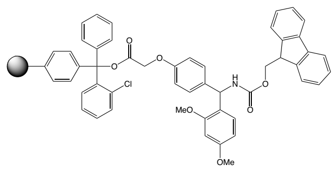
Mesh Size	100-200 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



BR-1315 Fmoc-Rink-Amide-2CT resin

Fmoc-Rink Amide 2-chlorotrityl Resin

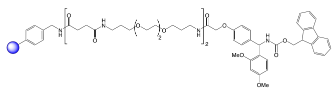
Mesh Size	200-400 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



BR-1360 Fmoc-Rink-Amide PEG AM Resin

Fmoc-Rink Amide PEG aminomethyl-polystyrene Resin

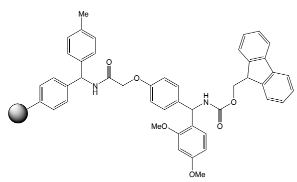
Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB



BR-1300 Fmoc-Rink-Amid MBHA resin

Fmoc-Rink-Amid-4-methylbenzhydrylamine resin, Knorr Resin

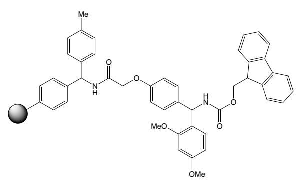
CAS-No.	431041-83-7
Mesh Size	100-200 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



BR-1305 Fmoc-Rink-Amide-MBHA resin

Fmoc-Rink-Amid-4-methylbenzhydrylamine resin, Knorr Resin

CAS-No.	431041-83-7
Mesh Size	200-400 mesh
Loading	0.4-0.9 mmol/g
DVB	1% DVB

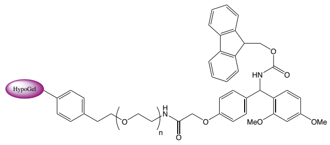


Product details

BRH1110 HypoGel® 200 RAM

Fmoc-Rink-Amide-PEG200-HypoGel

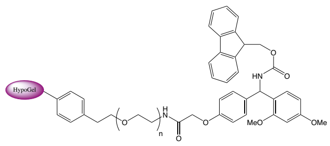
Mesh Size	110-150 µm
Loading	0.4-0.7 mmol/g



BRH1230 HypoGel® 400 RAM

Fmoc-Rink-Amide-PEG400-HypoGel (n=10)

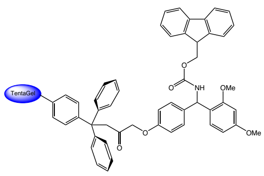
Mesh Size	110-150 µm
Loading	0.4-0.7 mmol/g



S309020 TG Rink-Trt (90µm)

Fmoc-Rink amide-trityl TentaGel

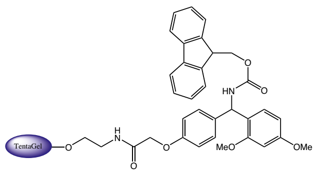
Mesh Size	90 µm
Loading	0.18 - 0.25 mmol/g



R28023 TG R RAM (90µm)

TentaGel R RAM (90µm)

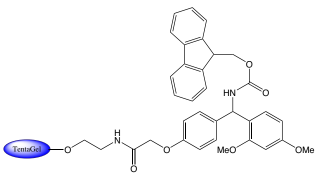
Loading	0.15-0.25 mmol/g



S-30023 TG S RAM (90µm)

TentaGel S RAM

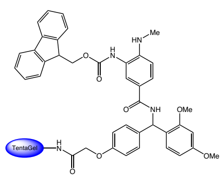
Mesh Size	90 µm
Loading	0.1-0.4 mmol/g



S-30091 Fmoc-MeDbz-RAM TG S

TentaGel S Dawson Fmoc-MeDbz RAM Resin

Mesh Size	90 µm
Loading	0.15 - 0.25 mmol/g



Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

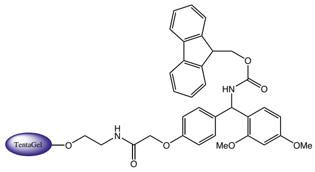
↑ back to content

Product details

HL12023 TG HL RAM (75µm)

TentaGel HL RAM (75µm)

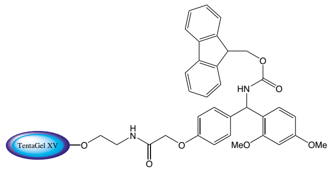
Loading	0.3-0.4 mmol/g



XV30023 TG XV RAM (100µm)

Fmoc-Rink-Amide-TentaGel XV

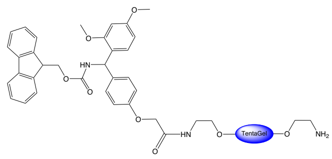
Mesh Size	100-200 µm
Loading	0.15-0.35 mmol/g



B3013223 TG B RAM/NH_2 (130 µm)

TentaGel B RAM/NH_2 (130 µm)

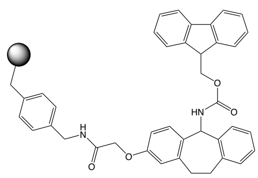
Mesh Size	130 µm
Loading	see description



BR-5204 Ramage Resin

2-(5-(9-Fluorenylmethyloxycarbonyl)amino-10,11-dihydro-5H-dibenzo[a,d]cycloheptenyl-2-oxy)actamido polystyrene

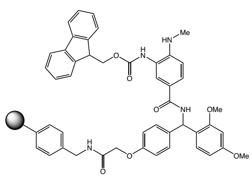
Mesh Size	100-200 mesh
Loading	0.3-1.5 mmol/g
DVB	1% DVB



H-10091 Fmoc-MeDbz-RAM Resin

3-(Fmoc-amino)-4-(methylamino)benzoyl-Rink amide-aminomethyl polystyrene resin

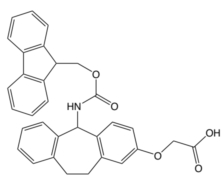
Mesh Size	100-200 mesh
Loading	0.3 - 0.6 mmol/g
DVB	1%



RL-1029 Ramage-Linker

(R,S)-2-{[5-(9-Fluorenylmethyloxycarbonylamino)-dibenzo[a,d]cycloheptane-2-yl]oxy}-acetic acid

CAS-No.	212783-75-0
Formula	$C_{32}H_{27}NO_5$
Mol. weight	505,58 g/mol

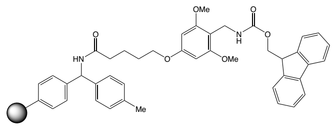


Product details

BR-5209 Fmoc-PAL-MBHA Resin

5-(4-Fmoc-aminomethyl-3,5-dimethoxyphenoxy)-pentanoyl amide 4-methyl-benzhydryl polystyrene

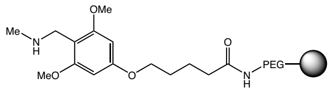
Mesh Size	100-200 mesh
Loading	0.4-0.8 mmol/g
DVB	1% DVB



BR-1050 N-Methyl-PAL-PEG resin

(5-(3,5-Dimethoxy-4-((methylamino)methyl)phenoxy) pentanoyl)aminoethyl polyethyleneglycol resin

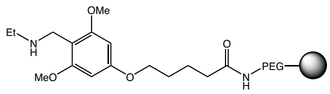
Mesh Size	90 µm
Loading	0,10-0,30
DVB	1%



BR-1070 N-Ethyl-PAL-PEG resin

(5-(3,5-Dimethoxy-4-((ethylamino)methyl)phenoxy) pentanoyl)aminoethyl polyethyleneglycol resin

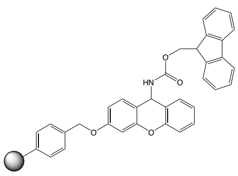
Mesh Size	90 µm
Loading	0,10-0,30
DVB	1%



BR-2000 Fmoc-Sieber-PS resin

Fmoc-Sieber-polystyrene resin

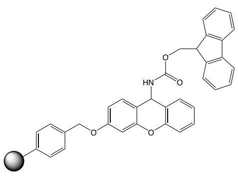
CAS-No.	915706-90-0
Mesh Size	100-200 mesh
Loading	0.5-0.9 mmol/g
DVB	1% DVB



BR-2001 Fmoc-Sieber-PS resin LL

Fmoc-Sieber-polystyrene resin

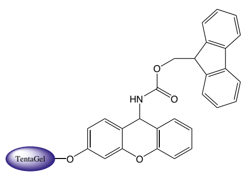
CAS-No.	915706-90-0
Mesh Size	100-200 mesh
Loading	0.2-0.3 mmol/g
DVB	1% DVB



BR-2005 Fmoc-Sieber-TG resin

Fmoc-Sieber-TentaGel resin

Loading	0.15-0.3 mmol/g



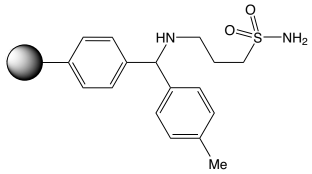
Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

↑ back to content

Product details

BR-5093 Safety Catch (Aliphatic) MBHA Resin

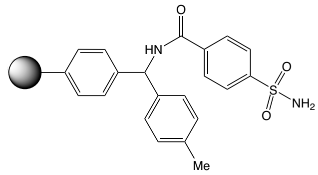
4-(Amidosulfonyl)butyramido-4-methyl-benzhydryl resin



Mesh Size	100-200 mesh
Loading	0.9-1.1 mmol/g
DVB	1% DVB

BR-5094 Safety Catch (Aromatic) MBHA Resin

4-(Amidosulfonyl)benzoylamido-4-methyl-benzhydryl resin



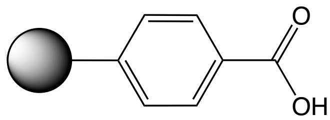
Mesh Size	100-200 mesh
Loading	0.7-1.3 mmol/g
DVB	1% DVB

9.1.5. Base Resins with Acid and Ester Functions

Product details

BR-5213 Polystyrene-COOH

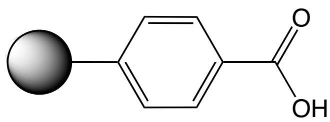
Carboxy polystyrene



Mesh Size	100-200 mesh
Loading	0.6-2.0 mmol/g
DVB	1% DVB

BR-5259 Polystyrene-COOH

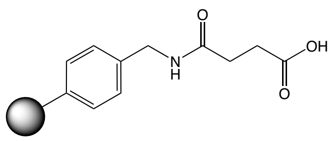
Carboxy polystyrene



Mesh Size	200-400 mesh
Loading	0.6-2.0 mmol/g
DVB	1% DVB

BR-5256 Polystyrene-AM-COOH

Aminomethyl-succinamic acid polystyrene

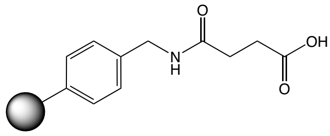


Mesh Size	100-200 mesh
Loading	0.6-1.5 mmol/g
DVB	1% DVB

BR-5257 Polystyrene-AM-COOH

Aminomethyl-succinamic acid polystyrene

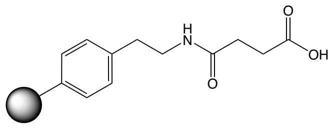
Mesh Size	200-400 mesh
Loading	0.6-1.5 mmol/g
DVB	1% DVB



BR-5251 Polystyrene-AE-COOH

Aminoethyl-succinamic acid polystyrene

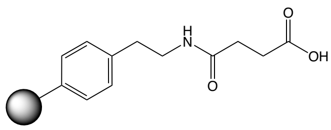
Mesh Size	100-200 mesh
Loading	0.6-1.2 mmol/g
DVB	1% DVB



BR-5252 Polystyrene-AE-COOH

Aminoethyl-succinamic acid polystyrene

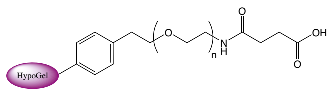
Mesh Size	200-400 mesh
Loading	0.6-1.2 mmol/g
DVB	1% DVB



BRH1000 HypoGel®200 COOH

HypoGel-PEG200-aminoalkyl-succinamic acid (n=5)

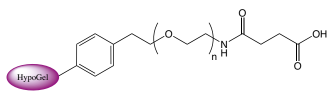
Mesh Size	110-150 µm
Loading	0.6-0.9 mmol/g



BRH1020 HypoGel®400 COOH

HypoGel-PEG400-aminoalkyl-succinamic acid (n=10)

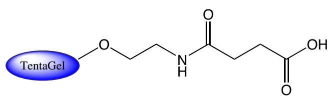
Mesh Size	110-150 µm
Loading	0.5-0.7 mmol/g



S-30903 TG S COOH (90µm)

TentaGel S COOH

Mesh Size	90 µm
Loading	0.2-0.3 mmol/g



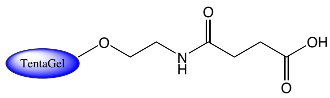
↑ back to content

Product details

S-30133 TG S COOH (130µm)

TentaGel S COOH

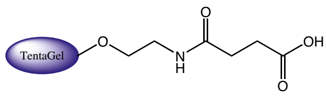
Mesh Size	130 µm
Loading	0.2-0.3 mmol/g



HL12903 TG HL COOH (75µm)

TentaGel HL COOH (75µm)

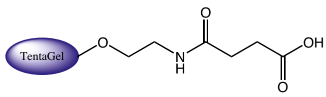
Loading	0.3-0.6 mmol/g



HL12133 TG HL COOH (110µm)

TentaGel HL COOH (110µm)

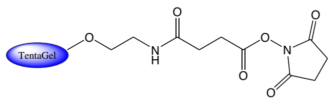
Loading	0.3-0.6 mmol/g



S-30905 TG S CO-NHS (90µm)

TentaGel S Succinimidyl ester

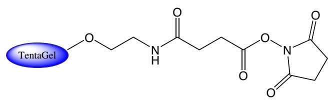
Mesh Size	90 µm
Loading	0.18-0.3 mmol/g



S-30135 TG S CO-NHS (130µm)

TentaGel S Succinimidyl ester

Mesh Size	130 µm
Loading	0.2-0.3 mmol/g



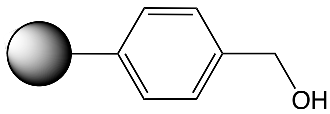
9.1.6. Base Resins with Alcohol Functions

Product details

BR-5019 Polystyrene-Me-OH

Hydroxymethylpolystyrene

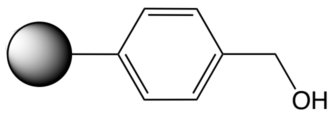
Mesh Size	100-200 mesh
Loading	0.7-1.6 mmol/g
DVB	1% DVB



BR-5020 Polystyrene-Me-OH

Hydroxymethylpolystyrene

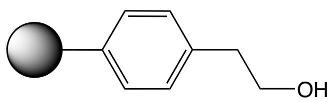
Mesh Size	200-400 mesh
Loading	0.7-1.2 mmol/g
DVB	1% DVB



BR-5113 Polystyrene-Et-OH

Hydroxyethylpolystyrene

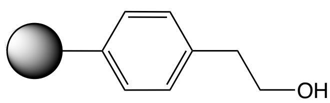
Mesh Size	100-200 mesh
Loading	0.6-1.5 mmol/g
DVB	1% DVB



BR-5114 Polystyrene-Et-OH

Hydroxyethylpolystyrene

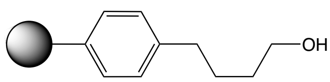
Mesh Size	200-400 mesh
Loading	0.6-1.5 mmol/g
DVB	1% DVB



BR-5111 Polystyrene-Bu-OH

Hydroxybutylpolystyrene

Mesh Size	100-200 mesh
Loading	0.6-1.2 mmol/g
DVB	1% DVB



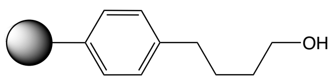
↑ back to content

Product details

BR-5112 Polystyrene-Bu-OH

Hydroxybutylpolystyrene

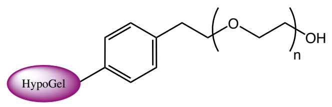
Mesh Size	200-400 mesh
Loading	0.6-1.2 mmol/g
DVB	1% DVB



BRH1280 HypoGel200® OH

HypoGel-PEG200-alcohol (n=5)

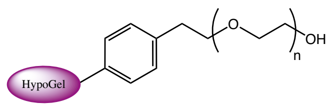
Loading	0.6-0.9 mmol/g



BRH1290 HypoGel400® OH

HypoGel-PEG400-alcohol (n=5)

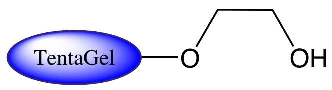
Loading	0.5-0.7 mmol/g



S-30130 TG S OH (130µm)

TentaGel S OH

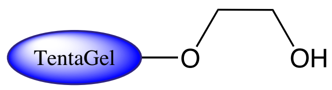
Mesh Size	130 µm
Loading	0.2-0.35 mmol/g



S-30900 TG S OH (90µm)

TentaGel S OH

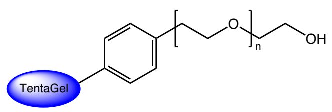
Mesh Size	90 µm
Loading	0.2-0.35 mmol/g



HL12900 TG HL OH (75µm)

TentaGel HL alcohol

Mesh Size	75 µm
Loading	0.4 - 0.6 mmol/g

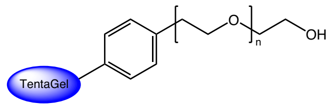


Product details

HL12130 TG HL OH (110µm)

TentaGel HL alcohol

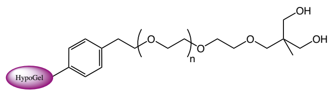
Mesh Size	110 µm
Loading	0.4 - 0.6 mmol/g



BRH1070 HypoGel® 200 Diol

HypoGel-PEG200-1,3-propanediol (n=5)

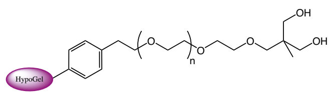
Mesh Size	110-150 µm
Loading	0.5-1.0 mmol/g



BRH1190 HypoGel® 400 Diol

HypoGel-PEG400-1,3-propanediol (n=10)

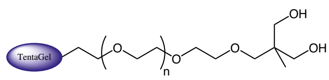
Mesh Size	110-150 µm
Loading	0.5-1.0 mmol/g



HL12010 TG HL Diol (75µm)

TentaGel HL Diol (75µm)

Loading	0.5-0.8 mmol/g



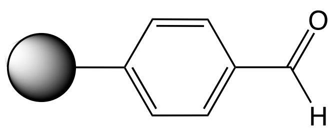
9.1.7. Base Resins with Aldehyde Functions

Product details

BR-5217 Polystyrene-CHO

Formylpolystyrene

Mesh Size	100-200 mesh
Loading	0.5-2.5 mmol/g
DVB	1% DVB



↑ back to content

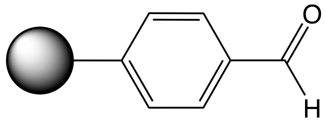
Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

Product details

BR-5263 Polystyrene-CHO

Formylpolystyrene

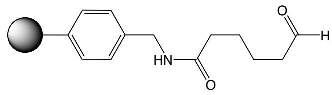
Mesh Size	200-400 mesh
Loading	0.5-2.5 mmol/g
DVB	1% DVB



BR-5254 Polystyrene-AM-CHO

6-Oxo-caproic amidomethyl polystyrene

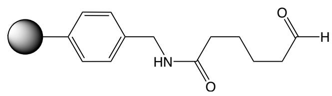
Mesh Size	100-200 mesh
Loading	0.5-1.0 mmol/g
DVB	1% DVB



BR-5255 Polystyrene-AM-CHO

6-Oxo-caproic amidomethyl polystyrene

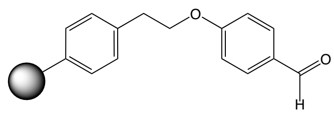
Mesh Size	200-400 mesh
Loading	0.5-1.0 mmol/g
DVB	1% DVB



BR-5276 Polystyrene-benzaldehyde

4-Alkoxybenzaldehyde resin

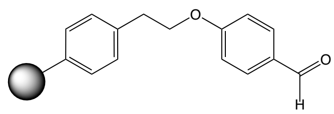
Mesh Size	100-200 mesh
Loading	0.5-1.1 mmol/g
DVB	1% DVB



BR-5277 Polystyrene-benzaldehyde

4-Alkoxybenzaldehyde resin

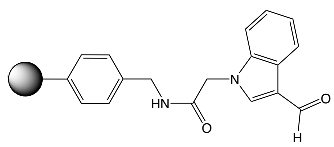
Mesh Size	200-400 mesh
Loading	0.5-1.1 mmol/g
DVB	1% DVB



BR-5218 Polystyrene-Indole-CHO

Indole Resin

Mesh Size	100-200 mesh
Loading	0.5-1.5 mmol/g
DVB	1% DVB

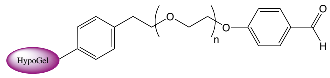


Product details

BRH1090 HypoGel® 200 FP

4-Formyl-phenoxy-PEG200-HypoGel (n=5)

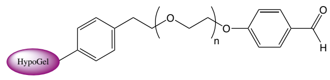
Mesh Size	110-150 µm
Loading	0.5-0.8 mmol/g



BRH1210 HypoGel® 400 FP

4-Formyl-phenoxy-PEG400-HypoGel (n=10)

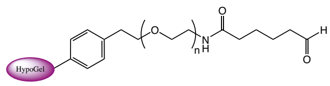
Mesh Size	110-150 µm
Loading	0.4-0.7 mmol/g



BRH1060 HypoGel® 200 CHO

6-Oxo-caproic-amidoalkyl-PEG200-HypoGel (n=5)

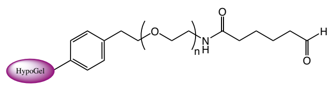
Mesh Size	110-150 µm
Loading	0.5-0.8 mmol/g



BRH1180 HypoGel® 400 CHO

6-Oxo-caproic-amidoalkyl-PEG400-HypoGel (n=10)

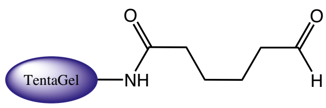
Mesh Size	110-150 µm
Loading	0.4-0.7 mmol/g



S-30906 TG S CHO (90µm)

TentaGel S CHO

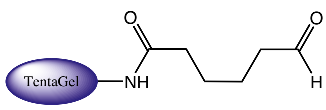
Mesh Size	90 µm
Loading	0.2-0.3 mmol/g



S-30136 TG S CHO (130µm)

TentaGel S CHO

Mesh Size	130 µm
Loading	0.2-0.3 mmol/g



↑ back to content

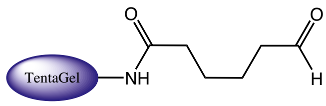
Resin Guideline

Product details

HL12906 TG HL CHO (75µm)

TG HL CHO (75µm)

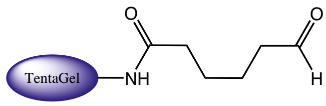
Loading 0.35-0.55 mmol/g



HL12136 TG HL CHO (110µm)

TentaGel HL CHO (110µm)

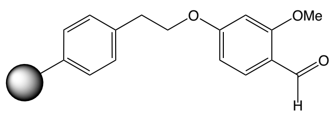
Loading 0.35-0.55 mmol/g



BR-5272 Polystyrene-FMP

4-Formyl-3-methoxyphenoxy-ethyl polystyrene

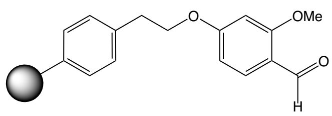
Mesh Size	100-200 mesh
Loading	0.5-1.1 mmol/g
DVB	1% DVB



BR-5273 Polystyrene-FMP

4-Formyl-3-methoxyphenoxy-ethyl polystyrene

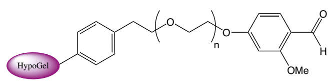
Mesh Size	200-400 mesh
Loading	0.5-1.1 mmol/g
DVB	1% DVB



BRH1080 HypoGel® 200 FMP

4-Formyl-3-methoxyphenoxy-PEG200-HypoGel (n=5)

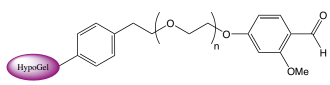
Mesh Size	110-150 µm
Loading	0.5-0.8 mmol/g



BRH1200 HypoGel® 400 FMP

4-Formyl-3-methoxyphenoxy-PEG400-HypoGel (n=10)

Mesh Size	110-150 µm
Loading	0.4-0.7 mmol/g

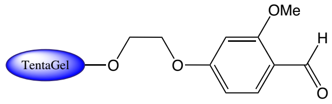


Product details

S-30016 TG S FMP (90µm)

TentaGel S FMP

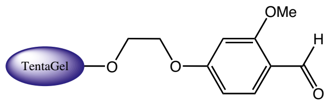
Mesh Size	90 µm
Loading	0.2-0.3 mmol/g



HL12016 TG HL FMP (75µm)

TentaGel HL FMP (75µm)

Loading	0.3-0.5 mmol/g



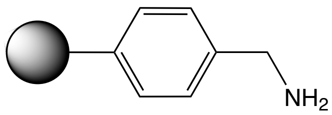
9.1.8. Base Resins with Amino and Hydrazino Functions

Product details

BR-1000a Polystyrene-Me-NH_2

Aminomethyl polystyrene

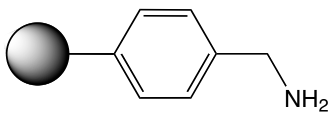
Mesh Size	100-200 mesh
Loading	0.4-0.9 mmol/g
DVB	1% DVB



BR-1000b Polystyrene-Me-NH_2

Aminomethyl polystyrene resin

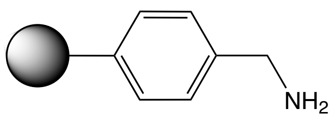
Mesh Size	100-200 mesh
Loading	0.9-1.3 mmol/g
DVB	1% DVB



BR-1000c Polystyrene-Me-NH_2

Aminomethyl polystyrene

Mesh Size	100-200 mesh
Loading	1.3-2.5 mmol/g
DVB	1% DVB



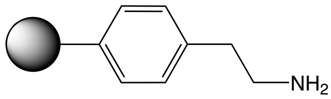
↑ back to content

Product details

BR-5266 Polystyrene-Et-NH_2

Aminoethyl polystyrene

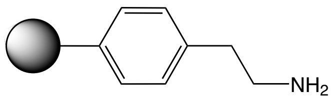
Mesh Size	100-200 mesh
Loading	0.6-1.4 mmol/g
DVB	1% DVB



BR-5268 Polystyrene-Et-NH_2

Aminoethyl polystyrene

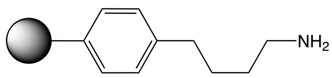
Mesh Size	200-400 mesh
Loading	0.6-1.4 mmol/g
DVB	1% DVB



BR-5261 Polystyrene-Bu-NH_2

Aminobutyl polystyrene

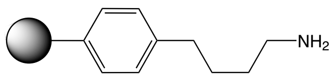
Mesh Size	45-80 µm
Loading	0.5-1.2 mmol/g
DVB	1% DVB



BR-5262 Polystyrene-Bu-NH_2

Aminobutyl polystyrene

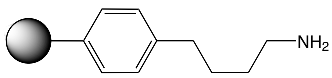
Mesh Size	80-160 µm
Loading	0.5-1.2 mmol/g
DVB	1% DVB



BR-5260 Polystyrene-Bu-NH_2

Aminobutyl polystyrene

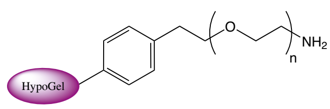
Mesh Size	125-160 µm
Loading	0.5-1.2 mmol/g
DVB	1% DVB



BRH1010 HypoGel®200 NH_2

HypoGel-PEG200-alkylamine (n=5)

Mesh Size	110-150 µm
Loading	0.6-0.9 mmol/g

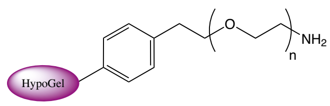


Product details

BRH1030 HypoGel®400 NH_2

HypoGel-PEG400-alkylamine (n=10)

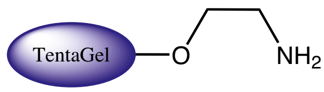
Loading	0.5-0.7 mmol/g



R28902 TG R NH_2 (90µm)

TentaGel R NH_2

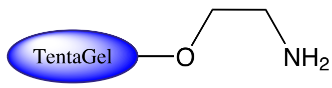
Mesh Size	90 µm
Loading	0.18-0.22 mmol/g



S-30902 TG S NH_2 (90µm)

TentaGel S NH_2

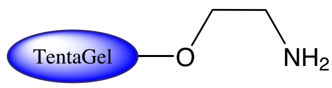
Mesh Size	90 µm
Loading	0.2-0.35 mmol/g



S-30132 TG S NH_2 (130µm)

TentaGel S NH_2

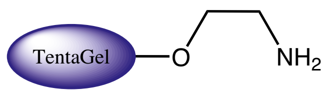
Mesh Size	130 µm
Loading	0.2-0.35 mmol/g



HL12902 TG HL NH_2 (75µm)

TentaGel HL NH_2 (75 µm, 0.4-0.6 mmol/g)

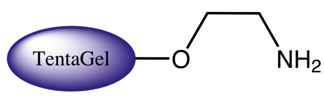
Loading	0.4-0.6 mmol/g



HL12132 TG HL NH_2 (110µm)

TentaGel HL NH_2 (110 µm, 0.4-0.6 mmol/g)

Loading	0.4-0.6 mmol/g



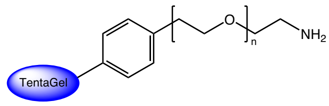
↑ back to content

Product details

HL12162 TG HL NH_2 (160µm)

TentaGel HL amine

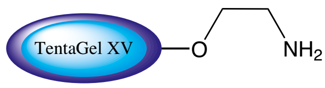
Mesh Size	160 µm
Loading	0.4 - 0.6 mmol/g



XV30002 TG XV NH_2 (100µm)

TentaGel XV NH_2

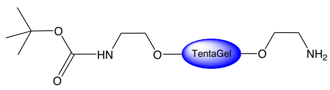
Mesh Size	100-200 µm
Loading	0.18-0.4 mmol/g



B3013212 TG B Boc/NH_2 (130 µm)

TentaGel B Boc/NH_2 (130 µm)

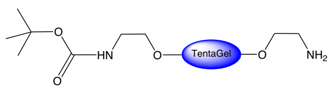
Mesh Size	130 µm
Loading	see description



B3013221 TG B NH_2/Boc (130 µm)

TentaGel B NH_2/Boc (130 µm)

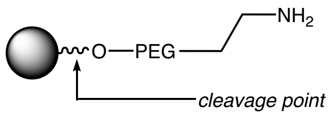
Mesh Size	130 µm
Loading	see description



TGJ1002 Polystyrene PEG-NH_2 (90µm)

Polystyrene PEG amine

Mesh Size	90 µm
Loading	0.18 - 0.25 mmol/g



References:

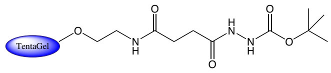
- *SPPS resins impact the PNA-syntheses' improvement; R. Pipkorn, S. Rawer, M. Wiessler, W. Waldeck, M. Koch, H. H. Schrenk, K. Braun;* ***Int J Med Sci*** *2013;* ***10****: 331-7.* https://doi.org/10.7150/ijms.5374
- *W. Rapp et al. in Peptides 2012, Proceedings of the 32nd European Peptide Symposium, G. Kokotos, V. Constantinou-Kokotos, J. Matsoukas (Eds.);* ***European Peptide Society*** *2012; p. 28.*
- *S. Rawer et al. in Peptides 2012, Proceedings of the 32nd European Peptide Symposium, G. Kokotos, V. Constantinou-Kokotos, J. Matsoukas (Eds.);* ***European Peptide Society*** *2012; p. 406.*

Product details

S-30907 TG S NH-NH-Boc (90µm)

TentaGel S NH-NH-Boc

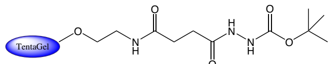
Mesh Size	90 µm
Loading	0.2-0.3 mmol/g



S-30137 TG S NH-NH-Boc (130µm)

TentaGel S NH-NH-Boc

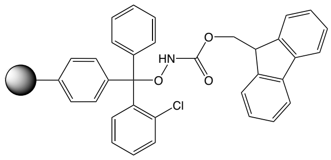
Mesh Size	130 µm
Loading	0.2-0.3 mmol/g



RAL1155 Fmoc-NH-O-2CT Resin

Fmoc-hydroxylamine-2-chlorotrityl resin

Mesh Size	200-400 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB



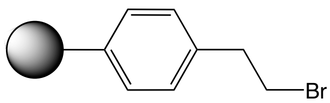
9.1.9. Base Resins with Halogens

Product details

BR-5264 Polystyrene-Et-Br

Bromoethyl polystyrene

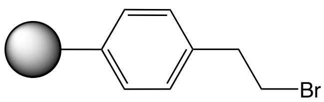
Mesh Size	100-200 mesh
Loading	0.6-1.2 mmol/g
DVB	1% DVB



BR-5265 Polystyrene-Et-Br

Bromoethyl polystyrene

Mesh Size	200-400 mesh
Loading	0.6-1.2 mmol/g
DVB	1% DVB



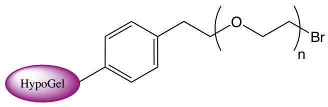
↑ back to content

Product details

BRH1040 HypoGel® 200 Br

Bromo-PEG200-HypoGel (n=5)

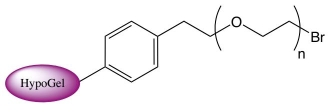
Mesh Size 110-150 µm
Loading 0.6-0.9 mmol/g



BRH1160 HypoGel® 400 Br

Bromo-PEG400-HypoGel (n=10)

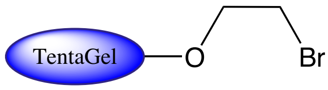
Mesh Size 110-150 µm
Loading 0.5-0.7 mmol/g



S-30901 TG S Br (90µm)

TentaGel S Br

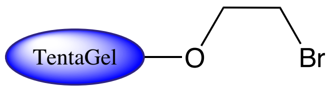
Mesh Size 90 µm
Loading 0.2-0.35 mmol/g



S-30131 TG S Br (130µm)

TentaGel S Br

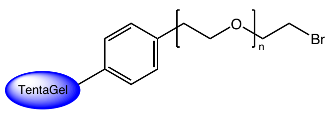
Mesh Size 130 µm
Loading 0.2-0.35 mmol/g



HL12901 TG HL Br (75µm)

TentaGel HL bromide

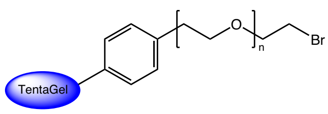
Mesh Size 75 µm
Loading 0.4 - 0.6 mmol/g



HL12131 TG HL Br (110µm)

TentaGel HL bromide

Mesh Size 110 µm
Loading 0.4 - 0.6 mmol/g

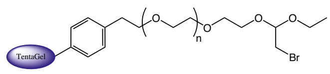


Product details

HL12019 TG HL Bromo Acetal (110µm)

TentaGel HL Bromo Acetal (110µm)

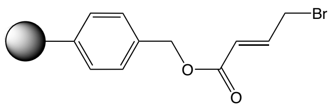
Loading 0.3-0.6 mmol/g



BR-5248 Polystyrene-Allyl

4-Bromocrotonoyl methylpolystyrene

Mesh Size	100-200 mesh
Loading	0.5-1.3 mmol/g
DVB	1% DVB



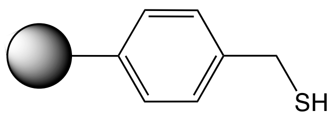
9.1.10. Thiol-Containing Base Resins

Product details

BR-5274 Polystyrene-Me-SH

Mercaptomethylpolystyrene

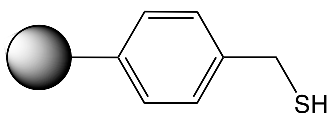
Mesh Size	100-200 mesh
Loading	0.5-1.0 mmol/g
DVB	1% DVB



BR-5275 Polystyrene-Me-SH

Mercaptomethylpolystyrene

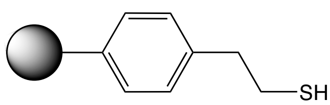
Mesh Size	200-400 mesh
Loading	0.5-1.0 mmol/g
DVB	1% DVB



BR-5270 Polystyrene-Et-SH

Mercaptoethylpolystyrene

Mesh Size	100-200 mesh
Loading	0.5-0.9 mmol/g
DVB	1% DVB



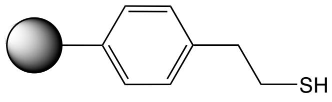
↑ back to content

Product details

BR-5271 Polystyrene-Et-SH

Mercaptoethylpolystyrene

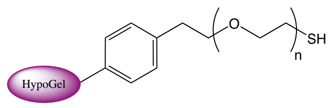
Mesh Size	200-400 mesh
Loading	0.5-0.9 mmol/g
DVB	1% DVB



BRH1130 HypoGel® 200 SH

Mercaptoalkyl-PEG200-HypoGel (n=5)

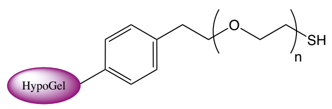
Mesh Size	110-150 µm



BRH1250 HypoGel® 400 SH

Mercaptoalkyl-PEG400-HypoGel (n=10)

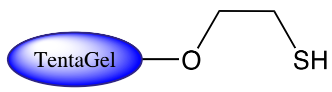
Mesh Size	110-150 µm
Loading	0.5-0.9 mmol/g



S309040 TG S SH (90µm)

TentaGel S SH

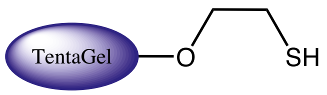
Mesh Size	90 µm
Loading	0.2-0.3 mmol/g



HL12134 TG HL SH (110µm)

TentaGel HL SH (110µm)

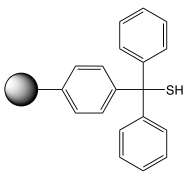
Loading	0.3-0.5 mmol/g



BR-5215 Trt-SH Resin

Thiol Trityl Resin

Mesh Size	100-200 mesh
Loading	0.6-1.2 mmol/g
DVB	1% DVB



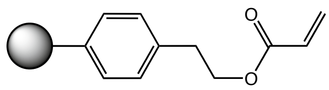
9.1.11. Base Resins with Vinyl Functions

Product details

SR-1036 REM Resin

Acryloylmethyl polystyrene

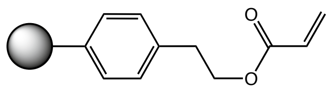
Mesh Size 100-200 mesh
Loading 0.5-1.3 mmol/g
DVB 1% DVB



SR-1118 REM Resin

Acryloylmethyl polystyrene

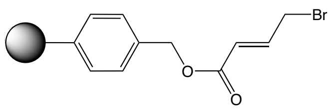
Mesh Size 200-400 mesh
DVB 1% DVB



BR-5248 Polystyrene-Allyl

4-Bromocrotonoyl methylpolystyrene

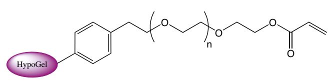
Mesh Size 100-200 mesh
Loading 0.5-1.3 mmol/g
DVB 1% DVB



BRH1120 HypoGel® 200 REM

Acryloyl-ethyl-PEG200-HypoGel (n=5)

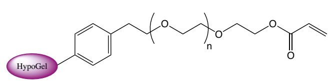
Mesh Size 110-150 µm
Loading 0.5-0.9 mmol/g



BRH1240 HypoGel® 400 REM

Acryloyl-ethyl-PEG400-HypoGel (n=10)

Mesh Size 110-150 µm
Loading 0.4-0.7 mmol/g



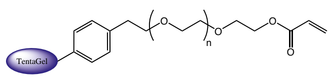
↑ back to content

Product details

HL12018 TG HL REM (75µm)

Acryloyl TentaGel HL resin

Loading 0.3-0.5 mmol/g



References:

→ *Solid Phase Peptide Synthesis of the Fragment BPC 157 of Human Gastric Juice Protein BPC and its Analogues; Z. Pflaum, R. Ručman;* ***Acta Chim. Slov.*** *2005; 52.*

→ *Solid Phase Synthesis of Peptides and Glycopeptides on Polymeric Supports with Allylic Anchor Groups; H. Kunz, B. Dombo;* ***Angew. Chem. Int. Ed.*** *1988;* ***27****: 711-713.* *https://doi.org/10.1002/anie.198807111*

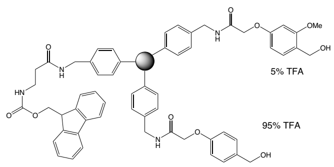
9.1.12. Multifunctional and other Special Resins

Product details

TR-1000 Polystyrene-AM-AC-HMPA

Trifunctionalized Polystyrene-[Fmoc-beta-Ala/AC-Linker/HMPA-Linker]

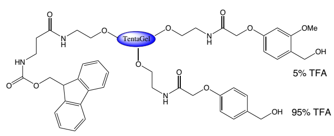
Mesh Size 75-100 mesh
Loading 0.15-0.3 mmol/g
DVB 1% DVB



TR-1200 TentaGel-AC-HMPA

Trifunctionalized TentaGel-[Fmoc-beta-Ala/AC-Linker/HMPA-Linker]

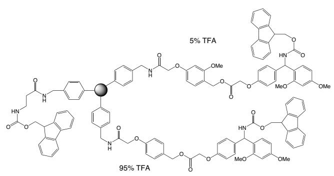
Mesh Size 90 µm
Loading 0.15-0.3 mmol/g



TR-2000 Polystyrene-AM-(AC-HMPA)-RAM

Trifunctionalized Polystyrene-[Fmoc-beta-Ala/AC-Rink-Linker/HMPA-Rink-Linker]

Mesh Size 75-100 mesh
Loading 0.15-0.3 mmol/g
DVB 1% DVB

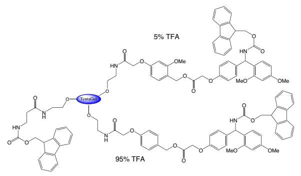


Product details

TR-2100 TentaGel-AM-(AC-HMPA)-RAM

Trifunctionalized TentaGel-[Fmoc-beta-Ala/AC-Rink-Linker/HMPA-Rink-Linker]

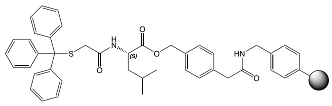
Mesh Size	90 µm
Loading	0.15-0.3 mmol/g



PAM5795 Trt-S-Ac-L-Leu-PAM Resin

2-(Tritylmercapto)acetyl-L-leucinyl-PAM Resin

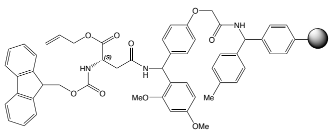
Mesh Size	100-200 mesh
Loading	0.5-0.9 mmol/g
DVB	1% DVB



CAA1000 Fmoc-L-Asn(Rink-Resin)-OAll

Fmoc-L-Asn(Rink Amide MBHA resin) alpha-allyl ester

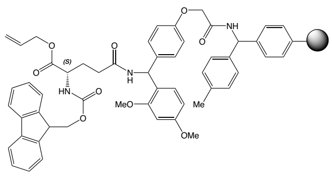
Mesh Size	100-200 mesh
Loading	0.15-0.5 mmol/g
DVB	1% DVB



RAA1077 Fmoc-L-Gln(Rink-Resin)-OAll

Fmoc-L-Gln(Rink Amide MBHA resin)-alpha-allyl ester

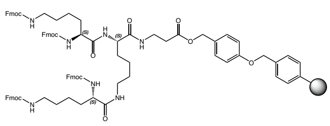
Mesh Size	100-200 mesh
Loading	0.15-0.5 mmol/g
DVB	1% DVB



WAA2014 (Fmoc)$_4$-Lys2-Lys-beta-Ala-Wang PS

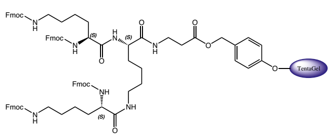
(Fmoc)$_4$-Lys$_2$-Lys-beta-Ala-Wang polystyrene resins

Mesh Size	100-200mesh
Loading	0.25-0.6 mmol/g
DVB	1% DVB



SAL2013 (Fmoc)$_4$-Lys2-Lys-beta-Ala-Wang TG

(Fmoc)$_4$-Lys$_2$-Lys-beta-Ala-Wang TentaGel



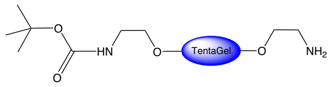
↑ back to content

	Product details

B3013212 TG B Boc/NH_2 (130 µm)

TentaGel B Boc/NH_2 (130 µm)

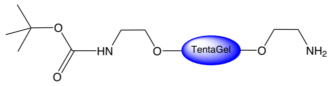
Mesh Size	130 µm
Loading	see description



B3013221 TG B NH_2/Boc (130 µm)

TentaGel B NH_2/Boc (130 µm)

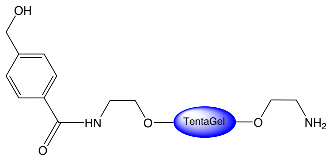
Mesh Size	130 µm
Loading	see description



B3013214 TG B HMB/NH_2 (130 µm)

TentaGel B HMB/NH_2 (130 µm)

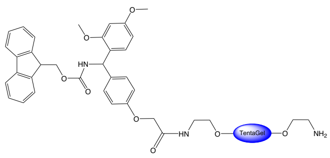
Mesh Size	130 µm
Loading	see description



B3013223 TG B RAM/NH_2 (130 µm)

TentaGel B RAM/NH_2 (130 µm)

Mesh Size	130 µm
Loading	see description



References:

- *Matrix assisted synthetic transformations: a mosaic of diverse contributions. II. The pattern is completed; D. Hudson;* ***J Comb Chem*** *1999;* ***1****: 403-57.* *https://doi.org/10.1021/cc990046s*
- *Parallel personal comments on "classical" papers in combinatorial chemistry; M. Lebl;* ***J Comb Chem*** *1999;* ***1****: 3-24.* *https://doi.org/10.1021/cc9800327*
- *Solid-phase organic reactions: A review of the recent literature; P. H. H. Hermkens, H. C. J. Ottenheijm, D. Rees;* ***Tetrahedron*** *1996;* ***52****: 4527-4554.* *https://doi.org/10.1016/0040-4020(96)00216-5*
- *Solid-phase organic reactions II: A review of the literature Nov 95–Nov 96; P. H. H. Hermkens, H. C. J. Ottenheijm, D. C. Rees;* ***Tetrahedron*** *1997;* ***53****: 5643-5678.* *https://doi.org/10.1016/s0040-4020(97)00279-2*

9.2. Preloaded Resins

9.2.1. Preloaded Resins for Boc Strategy

Solid phase peptide synthesis has been invented by using Merrifield resins, i.e. substituted methylpolystyrene. Amino acids have been protected at their α-amino function with Boc combined with orthogonal protection (Bzl and others) of the functional side groups. For final cleavage of the peptide, a strong acid like HF is required. Although this methodology produced highly pure peptides, the use is limited today due to the hazardous nature of HF. It almost has completely been substituted by the Fmoc/*t*Bu approach.

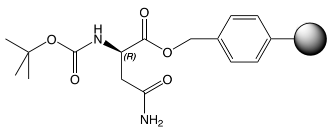
On demand we supply all L- and D-amino acids loaded onto Boc/Bzl compatible resins, like preloaded Merrifield and PAM resins.

Please inquire with type of amino acid, side protection, desired specifications and quantity.

Product details

MAA5310 Boc-D-Asn-Merrifield Resin

Mesh Size	100-200 mesh
Loading	0.1-0.5 mmol/g
DVB	1% DVB



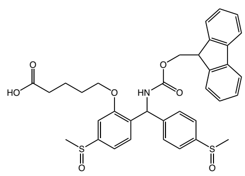
Safety Catch Acid-Labile Linker (SCAL-Linker)
Enabling Boc-Chemistry without the necessity to us HF!

Product details

RL-2260 Fmoc-NH-MsbH-COOH

5-(2-((((9H-fluoren-9-yl)methoxy)carbonylamino)(4-(methylsulfinyl)phenyl)methyl)-5-(methylsulfinyl)phenoxy)pentanoic acid

CAS-No.	147046-64-8
Formula	$C_{35}H_{35}NO_7S_2$
Mol. weight	645,78 g/mol



↑ back to content

Stable to:

- bases (aq. 0.5% NaOH, DBU in chloroform, 20-50% piperidine in DMF)
- acids (25-55% TFA/DCM, neat TFA 2x 2 h, HF at 0°C for 2x 2 h)
- Alloc/OAll deprotecting procedures
- hydrostannolysis (Bu_3SnH, $Pd(OAc)_2$, PPh_3 in AcOH and DCM)

When attached to a water compatible support like sepharose, the linker allows complete solid-phase chemical ligation after removing Acm protecting group from cysteine using $Hg(II)(AcO)_2$ in aq. acetic acid (pH 4).

Final detachment occurs by reduction of sulfoxides followed by acidolysis providing C-terminal peptide amides:

One-step procedures:
NH_4I/TFA/DMS (0°C to rt over 1 h) or 1 M $SiCl_4$ (TFA/thioanisole/cresol/ethandithiol (0°C, 2 h)

Two-step procedures:
a) reductive activation (TMSiCl/PPh_3 in DCM or THF, 20% $(EtO)_2P(S)SH$/DMPU, 0.1% HBr in AcOH (rt, 2 h)
b) acidolytic cleavage by a variety of TFA/scavengers mixtures (TFA/water, 95:5; TFA/DCM/water/Bu_3SiH, 85:10:2.5:2.5; TFA/*m*-cresole; TFA/DCM, 1:1)

Try the SCAL Linker and Enjoy Production of Peptides in High Yield & High Purity!

Reference:

→ *Safety-catch anchoring linkage for synthesis of peptide amides by BOC/Fmoc strategy; M. Pátek, M. Lebl;* ***Tetrahedron Lett.*** *1991;* ***32****: 3891-3894.* *https://doi.org/10.1016/s0040-4039(00)79406-8*

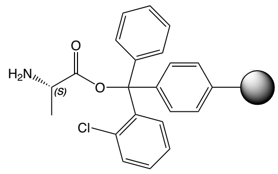
9.2.2. Preloaded Trityl Resins

Product details

RAA1005 H-L-Ala-2CT Resin

H-L-Ala-2-chlorotrityl resin

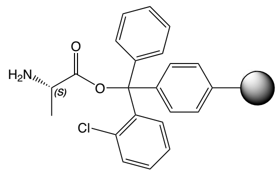
Mesh Size	100-200 mesh
Loading	0.3-1.3 mmol/g
DVB	1% DVB



RAA1006 H-L-Ala-2CT Resin

H-L-Ala-2-chlorotrityl resin

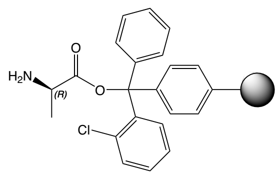
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1004 H-D-Ala-2CT Resin

H-D-Ala-2-chlorotrityl resin

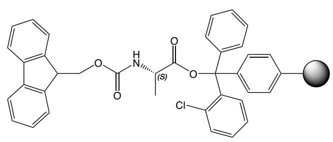
Mesh Size	100-200 mesh
Loading	0.5-1.0 mmol/g
DVB	1% DVB



RAA5910 Fmoc-L-Ala-2CT Resin

Fmoc-L-Ala-2-chlorotrityl resin

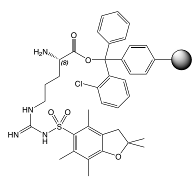
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1030 H-L-Arg(Pbf)-2CT Resin

H-L-Arg(Pbf)-2-chlorotrityl resin

Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



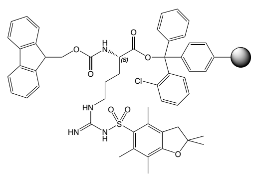
↑ back to content

Product details

RAA6136 Fmoc-L-Arg(Pbf)-2CT Resin

Fmoc-L-Arg(Pbf)-2-chlorotrityl resin

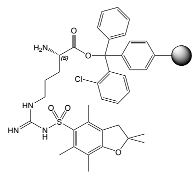
Mesh Size	100-200 mesh
Loading	0.3 - 0.8 mmol/g
DVB	1% DVB



RAA1031 H-L-Arg(Pbf)-2CT Resin

H-L-Arg(Pbf)-2-chlorotrityl resin

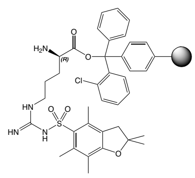
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1029 H-D-Arg(Pbf)-2CT Resin

H-D-Arg(Pbf)-2-chlorotrityl resin

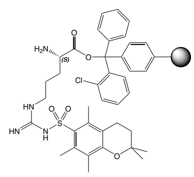
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1335 H-L-Arg(Pmc)-2CT Resin

H-L-Arg(Pmc)-2-chlorotrityl resin

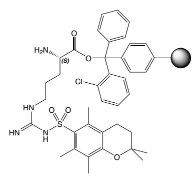
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1385 H-L-Arg(Pmc)-2CT Resin

H-L-Arg(Pmc)-2-chlorotrityl resin

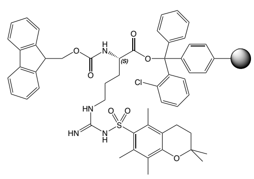
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA6135 Fmoc-L-Arg(Pmc)-2Ct Resin

Fmoc-L-Arg(Pmc)-2-chlorotrityl resin

Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB

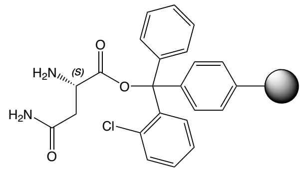


Product details

RAA1044 H-L-Asn-2CT Resin

H-L-Asn-2-chlorotrityl resin

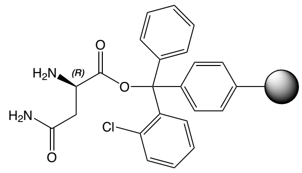
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1043 H-D-Asn-2CT Resin

H-D-Asn-2-chlorotrityl resin

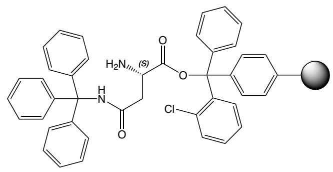
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1045 H-L-Asn(Trt)-2CT Resin

H-L-Asn(Trt)-2-chlorotrityl resin

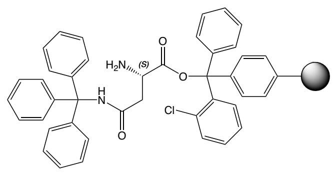
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1046 H-L-Asn(Trt)-2CT Resin

H-L-Asn(Trt)-2-chlorotrityl resin

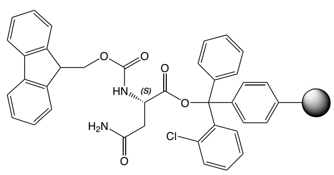
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1315 Fmoc-L-Asn-2CT Resin

Fmoc-L-Asn-2-chlorotrityl resin

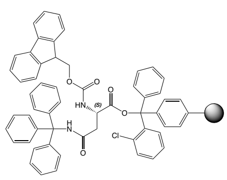
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA6208 Fmoc-L-Asn(Trt)-2CT Resin

Fmoc-L-Asn(Trt)-2-chlorotrityl resin

Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

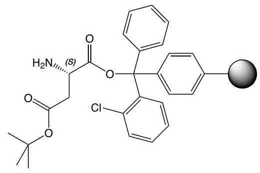
↑ back to content

Product details

RAA1047 H-L-Asp(OtBu)-2CT Resin

H-L-Asp(OtBu)-2-chlorotrityl resin

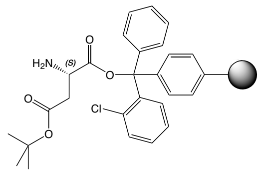
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1048 H-L-Asp(OtBu)-2CT Resin

H-L-Asp(OtBu)-2-chlorotrityl resin

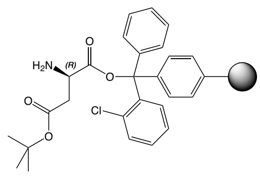
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1049 H-D-Asp(OtBu)-2CT Resin

H-D-Asp(OtBu)-2-chlorotrityl resin

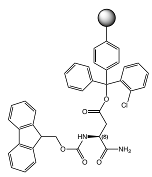
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA2610 Fmoc-L-Asp(2CT resin)-NH_2

Fmoc-L-Aspartate alpha-amide-beta-(2-chlorotrityl resin) ester

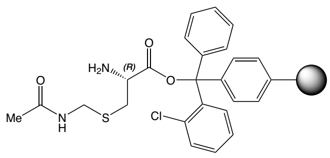
Mesh Size	100-200 mesh
Loading	ca. 0.5 mmol/g
DVB	1% DVB



RAA1345 H-L-Cys(Acm)-2CT Resin

H-L-Cys(Amc)-2-chlorotrityl resin

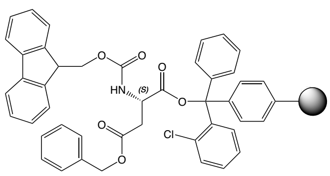
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA5193 Fmoc-L-Asp(OBzl)-2CT Resin

Fmoc-L-Asp(OBzl)-2-chlorotrityl resin

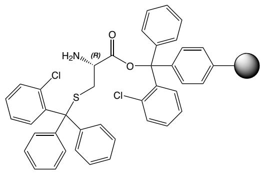
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1050 H-L-Cys(Clt)-2CT Resin

H-L-Cys(Clt)-2-chlorotrityl resin

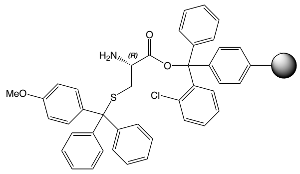
Mesh Size	100-200 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



RAA1055 H-L-Cys(Mmt)-2CT Resin

H-L-Cys(Mmt)-2-chlorotrityl resin

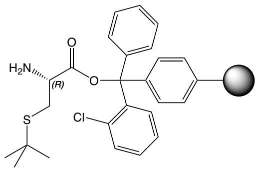
Mesh Size	100-200 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



RAA1355 H-L-Cys(*t*Bu)-2CT Resin

H-L-Cys(*t*Bu)-2-chlorotrityl resin

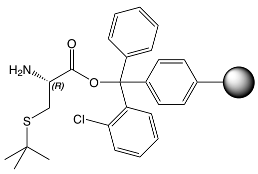
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1395 H-L-Cys(*t*Bu)-2CT Resin

H-L-Cys(*t*Bu)-2-chlorotrityl resin

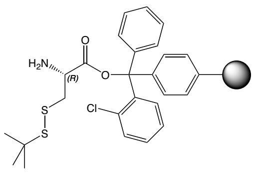
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1365 H-L-Cys(S*t*Bu)-2CT Resin

H-L-Cys(StBu)-2-chlorotrityl resin

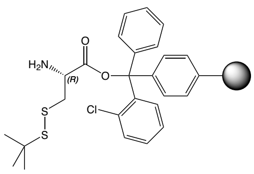
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1405 H-L-Cys(S*t*Bu)-2CT Resin

H-L-Cys(StBu)-2-chlorotrityl resin

Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



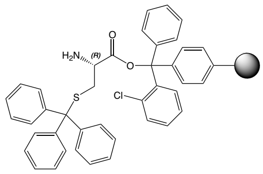
↑ back to content

Product details

RAA1065 H-L-Cys(Trt)-2CT Resin

H-L-Cys(Trt)-2-chlorotrityl resin

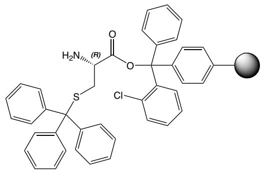
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1066 H-L-Cys(Trt)-2CT Resin

H-L-Cys(Trt)-2-chlorotrityl resin

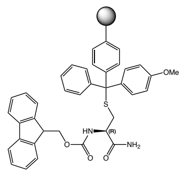
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA2620 Fmoc-L-Cys(Mmt resin)-NH_2

Fmoc-L-Cysteine alpha-amide-S-(4-methoxytrityl resin)

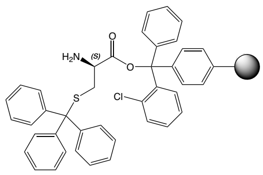
Mesh Size	100-200 mesh
Loading	ca. 0.5 mmol/g
DVB	1% DVB



RAA1060 H-D-Cys(Trt)-2CT Resin

H-D-Cys(Trt)-2-chlorotrityl resin

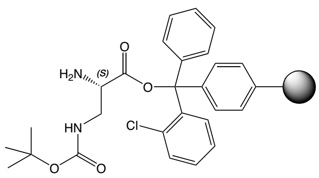
Mesh Size	100-200 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



RAA1330 H-L-Dap(Boc)-2CT Resin

H-L-Dap(Boc)-2-chlorotrityl resin

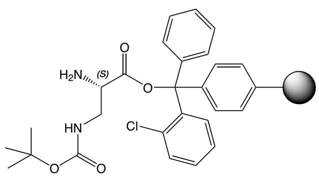
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1331 H-L-Dap(Boc)-2CT Resin

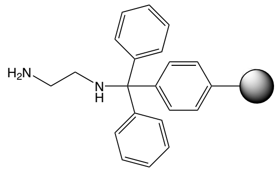
H-L-Dap(Boc)-2-chlorotrityl resin

Mesh Size	200-400 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



Product details

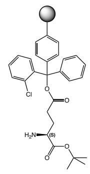
RDA1020 1,2-Diaminoethane-trityl resin



CAS-No.	1616282-53-1
Mesh Size	200-400 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB

RAA2700 H-L-Glu(2CT resin)-O*t*Bu

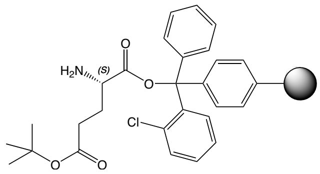
L-Glutamate alpha-*t*-butyl ester-gamma-(2-chlorotrityl resin) ester



Mesh Size	100-200 mesh
Loading	ca. 0.5 mmol/g
DVB	1% DVB

RAA1075 H-L-Glu(O*t*Bu)-2CT Resin

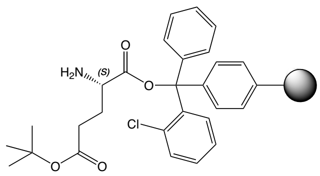
H-L-Glu(O*t*Bu)-2-chlorotrityl resin



Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB

RAA1076 H-L-Glu(O*t*Bu)-2CT Resin

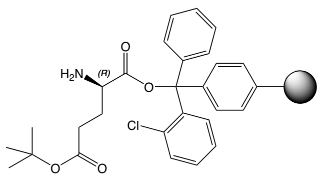
H-L-Glu(O*t*Bu)-2-chlorotrityl resin



Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB

RAA1074 H-D-Glu(O*t*Bu)-2CT Resin

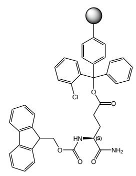
H-D-Glu(O*t*Bu)-2-chlorotrityl resin



Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB

RAA2630 Fmoc-L-Glu(2CT resin)-NH_2

Fmoc-L-Glutamate alpha-amide-gamma-(2-chlorotrityl resin) ester



Mesh Size	100-200 mesh
Loading	ca. 0.5 mmol/g
DVB	1% DVB

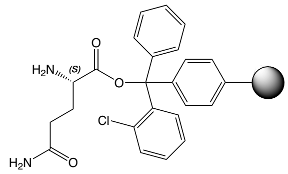
↑ back to content

Product details

RAA1085 H-L-Gln-2CT Resin

H-L-Gln-2-chlorotrityl resin

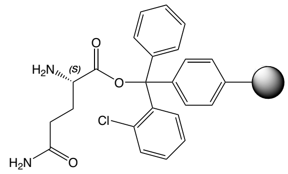
Mesh Size	100-200 mesh
DVB	1% DVB



RAA1086 H-L-Gln-2CT Resin

H-L-Gln-2-chlorotrityl resin

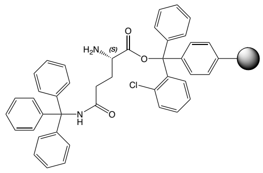
Mesh Size	200-400 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



RAA1087 H-L-Gln(Trt)-2CT Resin

H-L-Gln(Trt)-2-chlorotrityl resin

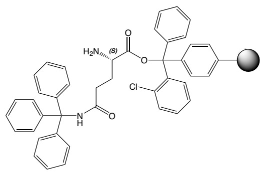
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1088 H-L-Gln(Trt)-2CT Resin

H-L-Gln(Trt)-2-chlorotrityl resin

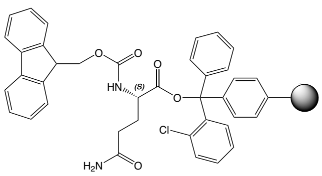
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1310 Fmoc-L-Gln-2CT Resin

Fmoc-L-Gln-2-chlorotrityl resin

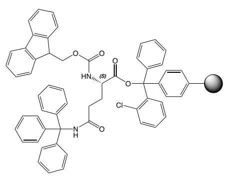
Mesh Size	100-200 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



RAA5951 Fmoc-L-Gln(Trt)-2CT Resin

Fmoc-L-Gln(Trt)-2-chlorotrityl resin

Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB

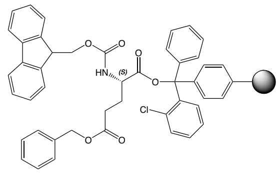


Product details

RAA5935 Fmoc-L-Glu(OBzl)-2CT Resin

Fmoc-L-Glu(OBzl)-2-chlorotrityl resin

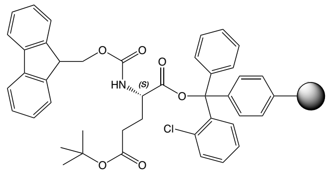
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA6125 Fmoc-L-Glu(OtBu)-2CT Resin

Fmoc-L-Glu(O*t*Bu)-2-chlorotrityl resin

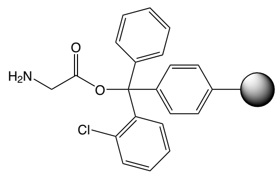
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1040 H-Gly-2CT Resin

H-Gly-2-chlorotrityl resin

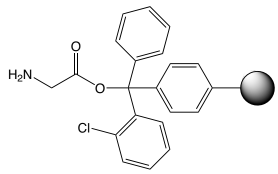
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1041 H-Gly-2CT Resin

H-Gly-2-chlorotrityl resin

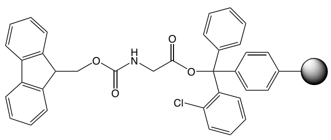
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1039 Fmoc-Gly-2CT Resin

Fmoc-Gly-2-chlorotrityl resin

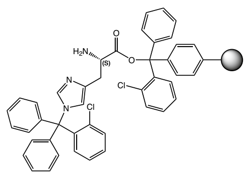
Mesh Size	100-200 mesh
DVB	1% DVB



RAA1093 H-L-His(Clt)-2CT Resin

H-L-His(Clt)-2-chlorotrityl resin

Mesh Size	100-200 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



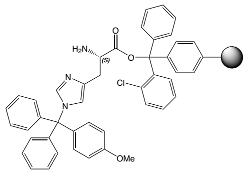
↑ back to content

Product details

RAA1095 H-L-His(Mmt)-2CT Resin

H-L-His(Mmt)-2-chlorotrityl resin

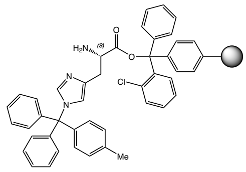
Mesh Size	100-200 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



RAA1097 H-L-His(Mtt)-2CT Resin

H-L-His(Mtt)-2-chlorotrityl resin

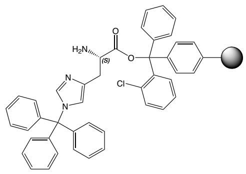
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1105 H-L-His(Trt)-2CT Resin

H-L-His(Trt)-2-chlorotrityl resin

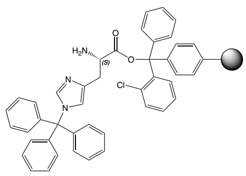
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1106 H-L-His(Trt)-2CT Resin

H-L-His(Trt)-2-chlorotrityl resin

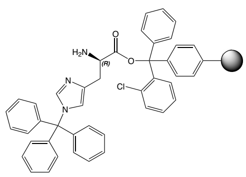
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1100 H-D-His(Trt)-2CT Resin

H-D-His(Trt)-2-chlorotrityl resin

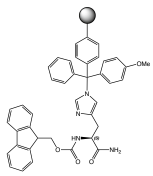
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA2640 Fmoc-L-His(Mmt resin)-NH_2

Fmoc-L-Histidine alpha-amide-Nim-(4-methoxytrityl resin)

Mesh Size	100-200 mesh
Loading	ca. 0.5 mmol/g
DVB	1% DVB

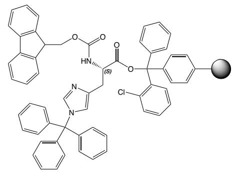


Product details

RAA5960 Fmoc-L-His(Trt)-2CT Resin

Fmoc-L-His(Trt)-2-chlorotrityl resin

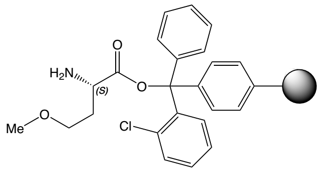
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1115 H-L-Hse(Me)-2CT Resin

H-L-Hse(Me)-2-chlorotrityl resin

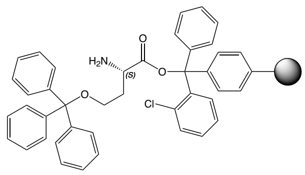
Mesh Size	100-200 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



RAA1125 H-L-Hse(Trt)-2CT Resin

H-L-Hse(Trt)-2-chlorotrityl resin

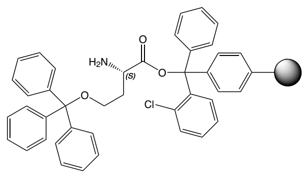
Mesh Size	100-200 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



RAA1126 H-L-Hse(Trt)-2CT Resin

H-L-Hse(Trt)-2-chlorotrityl resin

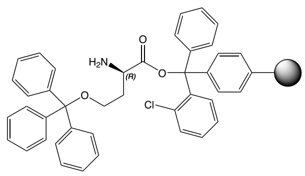
Mesh Size	200-400 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



RAA1120 H-D-Hse(Trt)-2CT Resin

H-D-Hse(Trt)-2-chlorotrityl resin

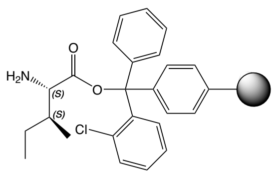
Mesh Size	100-200 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



RAA1135 H-L-Ile-2CT Resin

H-L-Ile-2-chlorotrityl resin

Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



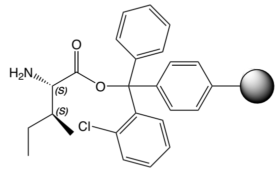
↑ back to content

Product details

RAA1136 H-L-Ile-2CT Resin

H-L-Ile-2-chlorotrityl resin

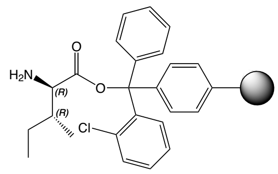
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1134 H-D-allo-Ile-2CT Resin

H-D-allo-Ile-2-chlorotrityl resin

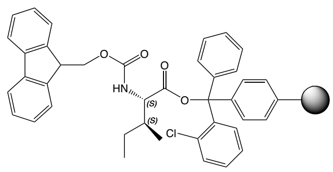
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA6140 Fmoc-L-Ile-2CT Resin

Fmoc-L-Ile-2-chlorotrityl resin

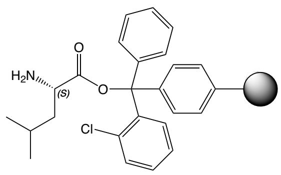
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1145 H-L-Leu-2CT Resin

H-L-Leu-2-chlorotrityl resin

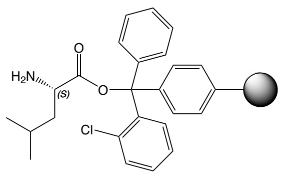
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1146 H-L-Leu-2CT Resin

H-L-Leu-2-chlorotrityl resin

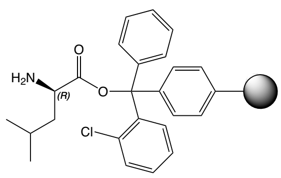
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1144 H-D-Leu-2CT Resin

H-D-Leu-2-chlorotrityl resin

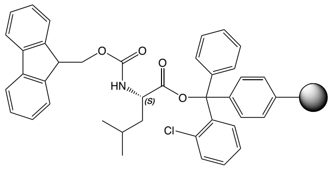
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA5940 Fmoc-L-Leu-2CT Resin

Fmoc-L-Leu-2-chlorotrityl resin

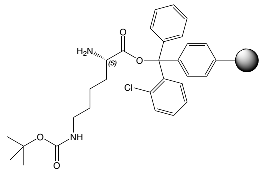
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1155 H-L-Lys(Boc)-2CT Resin

H-L-Lys(Boc)-2-chlorotrityl resin

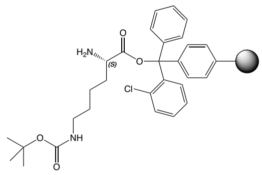
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1156 H-L-Lys(Boc)-2CT Resin

H-L-Lys(Boc)-2-chlorotrityl resin

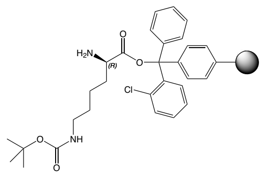
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1154 H-D-Lys(Boc)-2CT Resin

H-D-Lys(Boc)-2-chlorotrityl resin

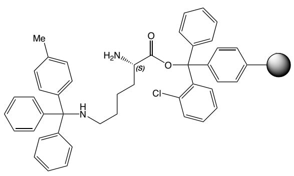
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1165 H-L-Lys(Mtt)-2CT Resin

H-L-Lys(Mtt)-2-chlorotrityl resin

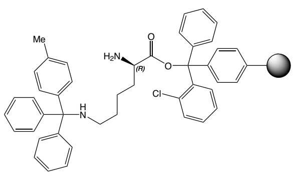
Mesh Size	100-200 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



RAA1160 H-D-Lys(Mtt)-2CT Resin

H-D-Lys(Mtt)-2-chlorotrityl resin

Mesh Size	100-200 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



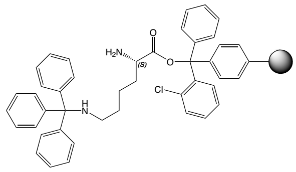
↑ back to content

Product details

RAA1167 H-L-Lys(Trt)-2CT Resin

H-L-Lys(Trt)-2-chlorotrityl resin

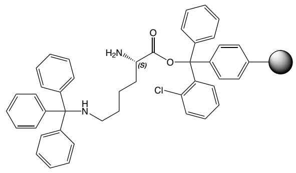
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1168 H-L-Lys(Trt)-2CT Resin

H-L-Lys(Trt)-2-chlorotrityl resin

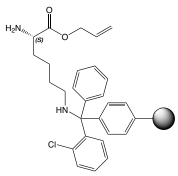
Mesh Size	200-400 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1320 H-L-Lys(2CT-Resin)-OAll

H-L-Lys(2-chlorotrityl resin)-OAll

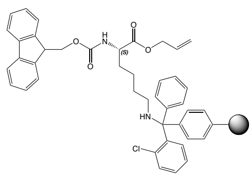
Mesh Size	100-200mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1325 Fmoc-L-Lys(2CT-Resin)-OAll

Fmoc-L-Lys(2-Chloro-Trityl-Resin)-OAll

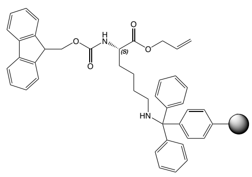
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



CAA1008 Fmoc-L-Lys(Trt-Resin)-OAll

Fmoc-L-Lys(Trityl-Resin)-OAll

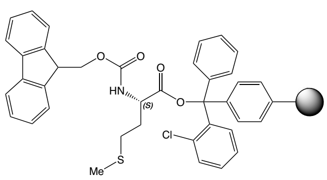
Mesh Size	100-200 mesh
Loading	0.15-0.5 mmol/g
DVB	1% DVB



RAA5980 Fmoc-L-Met-2CT Resin

Fmoc-L-Met-2-chlorotrityl resin

Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB

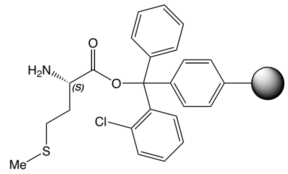


Product details

RAA1175 H-L-Met-2CT Resin

H-L-Met-2-chlorotrityl resin

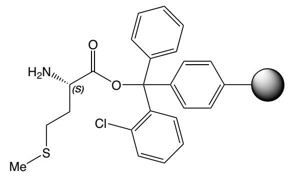
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1176 H-L-Met-2CT Resin

H-L-Met-2-chlorotrityl resin

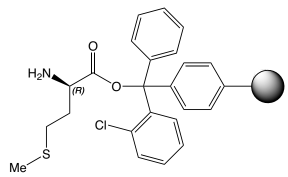
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1170 H-D-Met-2CT Resin

H-D-Met-2-chlorotrityl resin

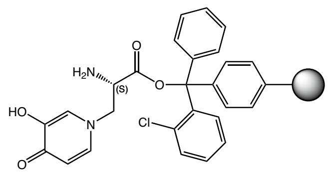
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA4000 H-L-Mim-2CT Resin

Mimosine-2-chlorotrityl resin

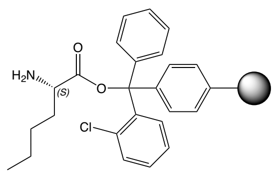
Mesh Size	100-200 mesh
Loading	ca. 0.45 mmol/g
DVB	1% DVB



RAA1375 H-L-Nle-2CT Resin

H-L-Nle-2-chlorotrityl resin

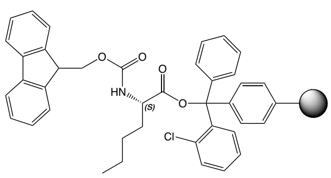
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA6220 Fmoc-L-Nle-2CT Resin

Fmoc-L-Nle-2-Chlorotrityl Resin

Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



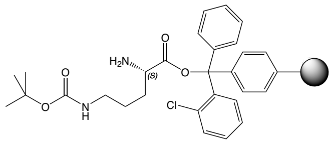
↑ back to content

Product details

RAA1185 H-L-Orn(Boc)-2CT Resin

H-L-Orn(Boc)-2-chlorotrityl resin

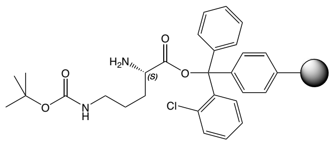
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1186 H-L-Orn(Boc)-2CT Resin

H-L-Orn(Boc)-2-chlorotrityl resin

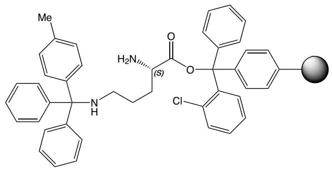
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1195 H-L-Orn(Mtt)-2CT Resin

H-L-Orn(Mtt)-2-chlorotrityl resin

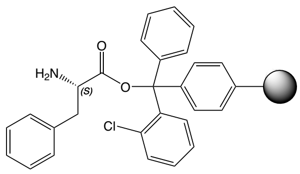
Mesh Size	100-200 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



RAA1205 H-L-Phe-2CT Resin

H-L-Phe-2-chlorotrityl resin

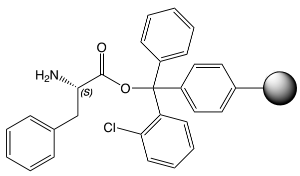
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1206 H-L-Phe-2CT Resin

H-L-Phe-2-chlorotrityl resin

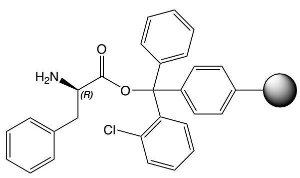
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1200 H-D-Phe-2CT Resin

H-D-Phe-2-chlorotrityl resin

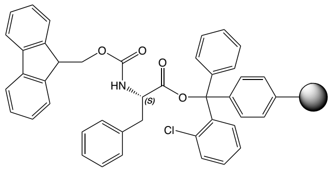
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA6102 Fmoc-L-Phe-2CT Resin

Fmoc-L-Phe-2-chlorotrityl resin

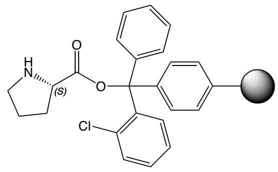
Mesh Size	75-100 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1220 H-L-Pro-2CT Resin

H-L-Pro-2-chlorotrityl resin

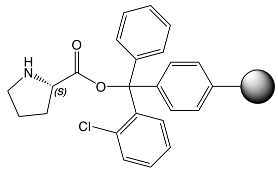
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1221 H-L-Pro-2CT Resin

H-L-Pro-2-chlorotrityl resin

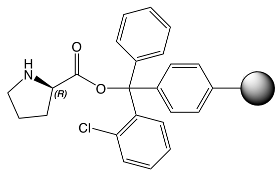
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA6225 H-D-Pro-2CT Resin

H-D-Pro-2-chlorotrityl resin

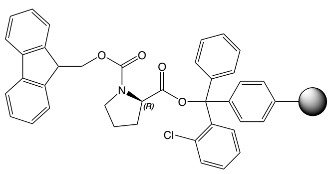
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1224 Fmoc-D-Pro-2CT Resin

Fmoc-D-Pro-2-chlorotrityl resin

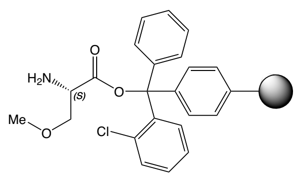
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1232 H-L-Ser(Me)-2CT Resin

H-L-Ser(Me)-2-chlorotrityl resin

Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

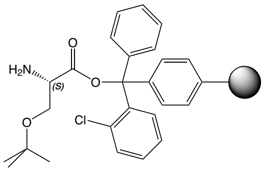
↑ back to content

Product details

RAA1230 H-L-Ser(*t*Bu)-2CT Resin

H-L-Ser(*t*Bu)-2-chlorotrityl resin

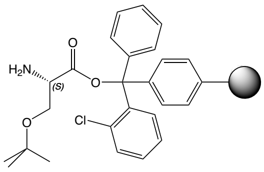
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1231 H-L-Ser(*t*Bu)-2CT Resin

H-L-Ser(*t*Bu)-2-chlorotrityl resin

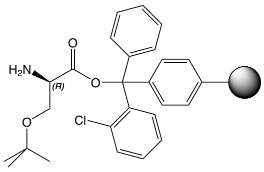
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1229 H-D-Ser(*t*Bu)-2CT Resin

H-D-Ser(*t*Bu)-2-chlorotrityl resin

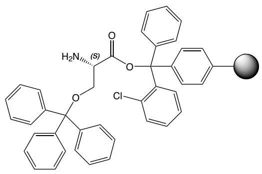
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1240 H-L-Ser(Trt)-2CT Resin

H-L-Ser(Trt)-2-chlorotrityl resin

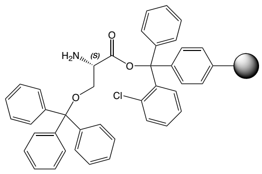
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1241 H-L-Ser(Trt)-2CT Resin

H-L-Ser(Trt)-2-chlorotrityl resin

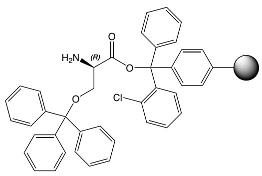
Mesh Size	200-400 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1235 H-D-Ser(Trt)-2CT Resin

H-D-Ser(Trt)-2-chlorotrityl resin

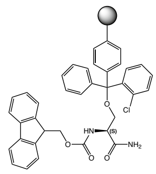
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA2670 Fmoc-L-Ser(2CT resin)-NH_2

Fmoc-L-Serine alpha-amide-O-(2-chlorotrityl resin)

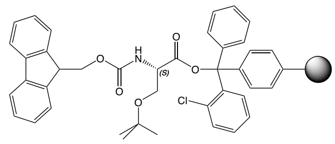
Mesh Size	100-200 mesh
Loading	ca. 0.5 mmol/g
DVB	1% DVB



RAA6106 Fmoc-L-Ser(*t*Bu)-2CT Resin

Fmoc-L-Ser(But)-2-chlorotrityl resin

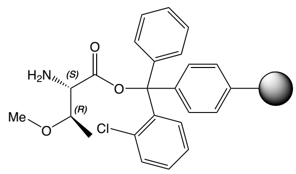
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1252 H-L-Thr(Me)-2CT Resin

H-L-Thr(Me)-2-chlorotrityl resin

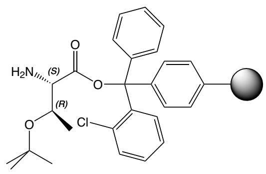
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1250 H-L-Thr(*t*Bu)-2CT Resin

H-L-Thr(*t*Bu)-2-chlorotrityl resin

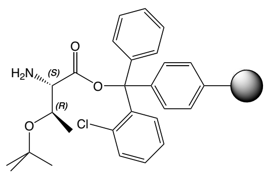
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1251 H-L-Thr(*t*Bu)-2CT Resin

H-L-Thr(*t*Bu)-2-chlorotrityl resin

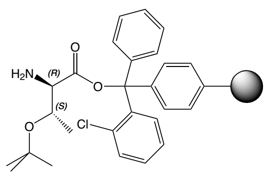
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1249 H-D-Thr(*t*Bu)-2CT Resin

H-D-Thr(*t*Bu)-2-chlorotrityl resin

Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



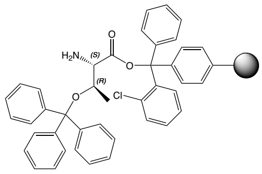
↑ back to content

Product details

RAA1260 H-L-Thr(Trt)-2CT Resin

H-L-Thr(Trt)-2-chlorotrityl resin

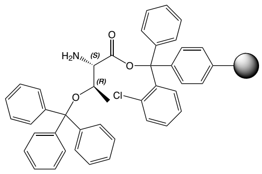
Mesh Size	100-200 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



RAA1261 H-L-Thr(Trt)-2CT Resin

H-L-Thr(Trt)-2-chlorotrityl resin

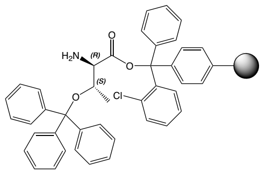
Mesh Size	200-400 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



RAA1255 H-D-Thr(Trt)-2CT Resin

H-D-Thr(Trt)-2-chlorotrityl resin

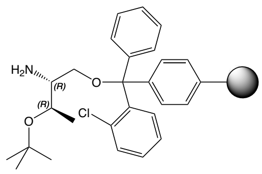
Mesh Size	100-200 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



RAL1114 H-L-Thr(*t*Bu)-ol-2CT Resin

L-Thr(*t*Bu)-ol-2-chlorotrityl resin

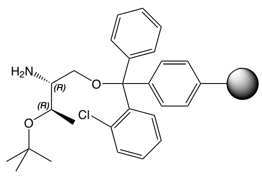
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAL1115 H-L-Thr(*t*Bu)-ol-2CT Resin

L-Thr(*t*Bu)-ol-2-chlorotrityl resin

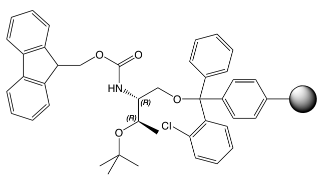
Mesh Size	200-400 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



RAL1126 Fmoc-L-Thr(*t*Bu)-ol-2CT Resin

Fmoc-L-Thr(*t*Bu)-ol-2-chlorotrityl resin

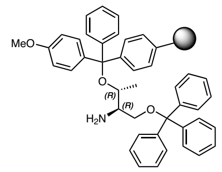
Mesh Size	200-400 mesh
Loading	0.4-0.8 mmol/g
DVB	1% DVB



RAL1190 H-L-Threoninol(Mmt resin)-OTrt

H-L-Threoninol(4-Methoxytrityl resin)-OTrt

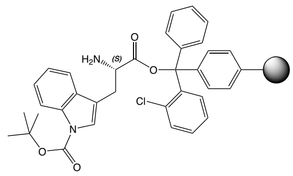
Mesh Size	100-200 mesh
Loading	0.3-0.65 mmol/g
DVB	1%



RAA1305 H-L-Trp(Boc)-2CT Resin

H-L-Trp(Boc)-2-chlorotrityl resin

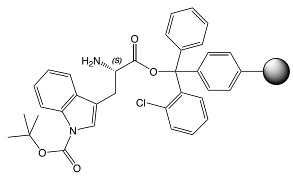
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1306 H-L-Trp(Boc)-2CT Resin

H-L-Trp(Boc)-2-chlorotrityl resin

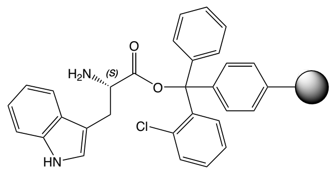
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1270 H-L-Trp-2CT Resin

H-L-Trp-2-chlorotrityl resin

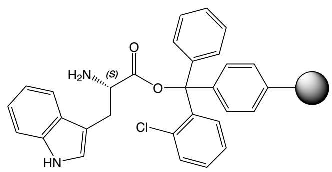
Mesh Size	100-200 mesh
Loading	0.5-1.0 mmol/g
DVB	1% DVB



RAA1271 H-L-Trp-2CT Resin

H-L-Trp-2-chlorotrityl resin

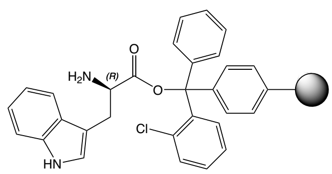
Mesh Size	200-400 mesh
Loading	0.5-1.0 mmol/g
DVB	1% DVB



RAA1265 H-D-Trp-2-CT Resin

H-D-Trp-2-chlorotrityl resin

Mesh Size	100-200 mesh
Loading	0.4-0.8 mmol/g
DVB	1% DVB



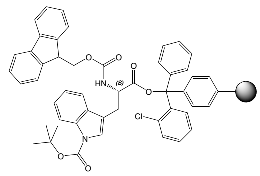
↑ back to content

Product details

RAA5941 Fmoc-L-Trp(Boc)-2CT Resin

Fmoc-L-Trp(Boc)-2-chlorotrityl resin

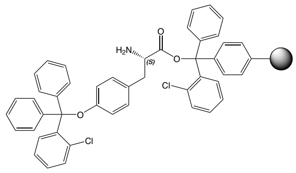
Mesh Size	100-200 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



RAA1290 H-L-Tyr(Clt)-2CT Resin

H-L-Tyr(Clt)-2-chlorotrityl resin

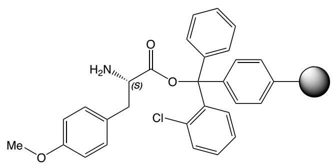
Mesh Size	100-200 mesh
Loading	> 0.4 mmol/g
DVB	1% DVB



RAA1292 H-L-Tyr(Me)-2CT Resin

H-L-Tyr(Me)-2-chlorotrityl resin

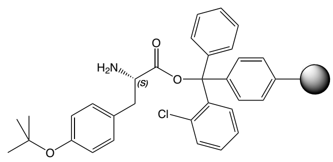
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA1280 H-L-Tyr(*t*Bu)-2CT Resin

H-L-Tyr(*t*Bu)-2-chlorotrityl resin

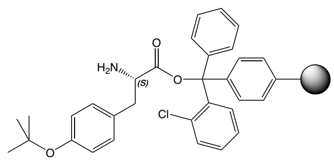
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1281 H-L-Tyr(*t*Bu)-2CT Resin

H-L-Tyr(*t*Bu)-2-chlorotrityl resin

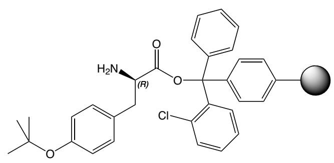
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1282 H-D-Tyr(*t*Bu)-2CT Resin

H-D-Tyr(*t*Bu)-2-chlorotrityl resin

Mesh Size	200-400 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB

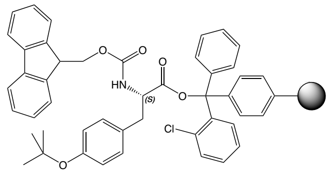


Product details

RAA5420 Fmoc-L-Tyr(*t*Bu)-2CT Resin

Fmoc-L-Tyr(But)-2-chlorotrityl resin

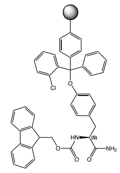
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA2690 Fmoc-L-Tyr(2CT resin)-NH_2

Fmoc-L-Tyrosine alpha-amide-O-(2-chlorotrityl resin)

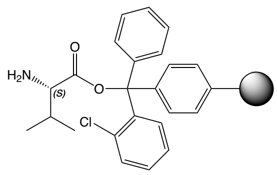
Mesh Size	100-200 mesh
Loading	ca. 0.5 mmol/g
DVB	1% DVB



RAA1300 H-L-Val-2CT Resin

H-L-Val-2-chlorotrityl resin

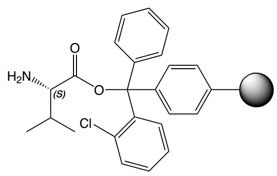
Mesh Size	100-200 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1301 H-L-Val-2CT Resin

H-L-Val-2-chlorotrityl resin

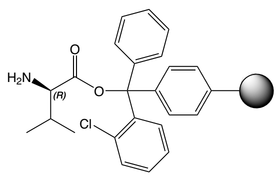
Mesh Size	200-400 mesh
Loading	0.4-1.2 mmol/g
DVB	1% DVB



RAA1299 H-D-Val-2CT Resin

H-D-Val-2-chlorotrityl resin

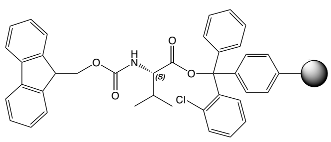
Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



RAA5915 Fmoc-L-Val-2-CT Resin

Fmoc-L-Val-2-chlorotrityl resin

Mesh Size	100-200 mesh
Loading	> 0.5 mmol/g
DVB	1% DVB



↑ back to content

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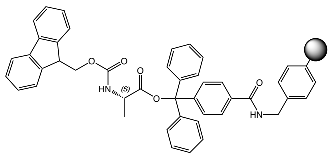
9.2.3. Preloaded TCP Resins for the Synthesis of Protected Peptides

Product details

TCP1000 Fmoc-L-Ala-TCP-Resin

Fmoc-Ala-trityl-carboxyamidomethyl polystyrene

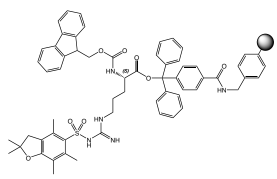
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1220 Fmoc-L-Arg(Pbf)-TCP-Resin

Fmoc-Arg(Pbf)-trityl-carboxyamidomethyl polystyrene

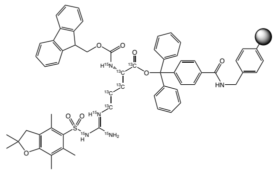
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1270 Fmoc-L-Arg(Pbf)-[13C6,15N4]-TCP-Resin

Fmoc-Arg(Pbf)-[13C6,15N4]-trityl-carboxyamidomethyl polystyrene

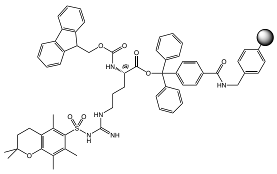
Mesh Size	200-400 mesh
Loading	0.1-0.3 mmol/g
DVB	1% DVB



TCP1210 Fmoc-L-Arg(Pmc)-TCP-Resin

Fmoc-Arg(Pmc)-trityl-carboxyamidomethyl polystyrene

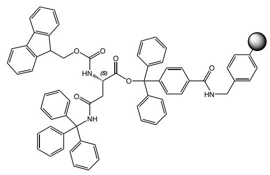
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1090 Fmoc-L-Asn(Trt)-TCP-Resin

Fmoc-Asn(Trt)-trityl-carboxyamidomethyl polystyrene

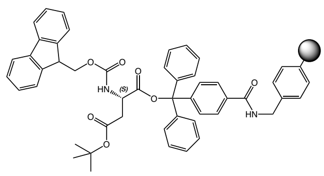
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1100 Fmoc-L-Asp(O*t*Bu)-TCP-Resin

Fmoc-Asp(OtBu)-trityl-carboxyamidomethyl polystyrene

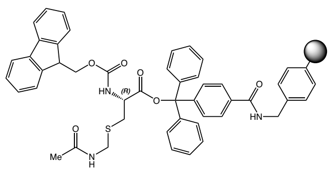
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1110 Fmoc-L-Cys(Acm)-TCP-Resin

Fmoc-Cys(Acm)-trityl-carboxyamidomethyl polystyrene

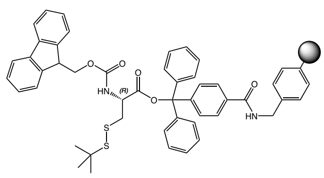
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1230 Fmoc-L-Cys(S*t*Bu)-TCP-Resin

Fmoc-Cys(StBu)-trityl-carboxyamidomethyl polystyrene

Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



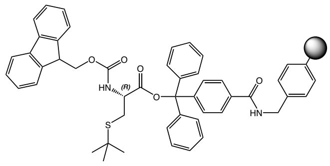
↑ back to content

Product details

TCP1120 Fmoc-L-Cys(*t*Bu)-TCP-Resin

Fmoc-Cys(*t*Bu)-trityl-carboxyamidomethyl polystyrene

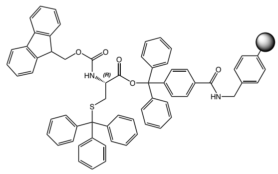
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1130 Fmoc-L-Cys(Trt)-TCP-Resin

Fmoc-Cys(Trt)-trityl-carboxyamidomethyl polystyrene

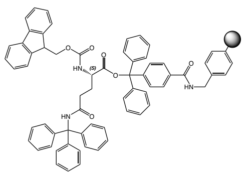
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1140 Fmoc-L-Gln(Trt)-TCP-Resin

Fmoc-Gln(Trt)-trityl-carboxyamidomethyl polystyrene

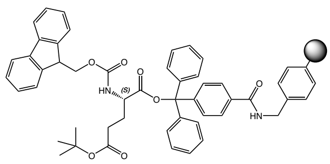
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1150 Fmoc-L-Glu(O*t*Bu)-TCP-Resin

Fmoc-Glu(O*t*Bu)-trityl-carboxyamidomethyl polysty-rene

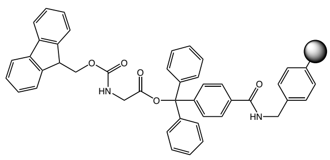
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1010 Fmoc-Gly-TCP-Resin

Fmoc-Gly-trityl-carboxyamidomethyl polystyrene

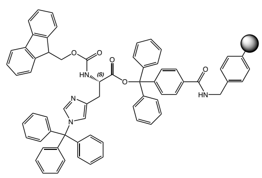
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1160 Fmoc-L-His(Trt)-TCP-Resin

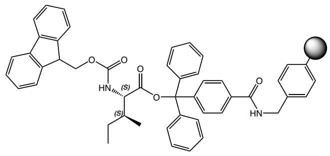
Fmoc-His(Trt)-trityl-carboxyamidomethyl polystyrene

Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1020 Fmoc-L-Ile-TCP-Resin

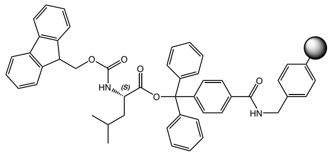
Fmoc-Ile-trityl-carboxyamidomethyl polystyrene



Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB

TCP1030 Fmoc-L-Leu-TCP-Resin

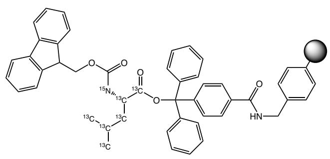
Fmoc-Leu-trityl-carboxyamidomethyl polystyrene



Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB

TCP1280 Fmoc-L-Leu-[13C6,15N]-TCP-Resin

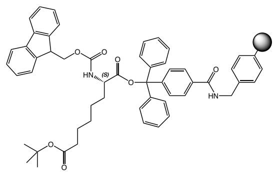
Fmoc-Leu-[13C6,15N]-trityl-carboxyamidomethyl polystyrene



Mesh Size	200-400 mesh
Loading	0.1-0.3 mmol/g
DVB	1% DVB

TCP1170 Fmoc-L-Lys(Boc)-TCP-Resin

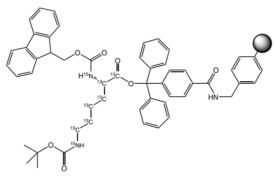
Fmoc-Lys(Boc)-trityl-carboxyamidomethyl polystyrene



Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB

TCP1290 Fmoc-L-Lys(Boc)-[13C6,15N2]-TCP-Resin

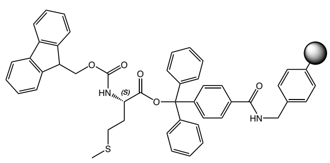
Fmoc-Lys(Boc)-[13C6,15N2]-trityl-carboxyamidomethyl polystyrene



Mesh Size	200-400 mesh
Loading	0.1-0.3 mmol/g
DVB	1% DVB

TCP1040 Fmoc-L-Met-TCP-Resin

Fmoc-Met-trityl-carboxyamidomethyl polystyrene



Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB

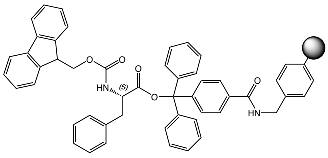
↑ back to content

Product details

TCP1050 Fmoc-L-Phe-TCP-Resin

Fmoc-Phe-trityl-carboxyamidomethyl polystyrene

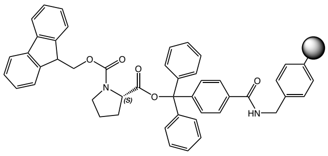
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1060 Fmoc-L-Pro-TCP-Resin

Fmoc-Pro-trityl-carboxyamidomethyl polystyrene

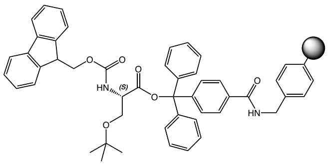
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1180 Fmoc-L-Ser(*t*Bu)-TCP-Resin

Fmoc-Ser(*t*Bu)-trityl-carboxyamidomethyl polystyrene

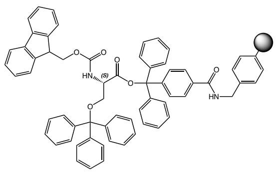
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1240 Fmoc-L-Ser(Trt)-TCP-Resin

Fmoc-Ser(Trt)-trityl-carboxyamidomethyl polystyrene

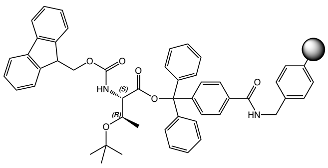
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1190 Fmoc-L-Thr(*t*Bu)-TCP-Resin

Fmoc-Thr(*t*Bu)-trityl-carboxyamidomethyl polystyrene

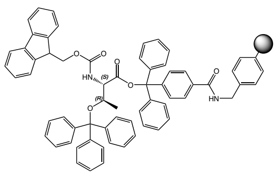
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1250 Fmoc-L-Thr(Trt)-TCP-Resin

Fmoc-Thr(Trt)-trityl-carboxyamidomethyl polystyrene

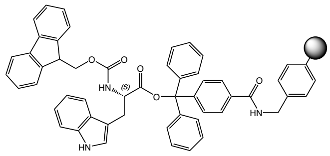
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1070 Fmoc-L-Trp-TCP-Resin

Fmoc-Trp-trityl-carboxyamidomethyl polystyrene

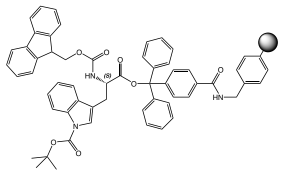
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1260 Fmoc-L-Trp(Boc)-TCP-Resin

Fmoc-Trp(Boc)-trityl-carboxyamidomethyl polystyrene

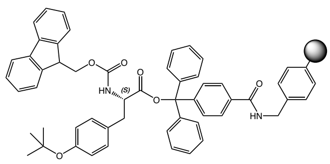
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1200 Fmoc-L-Tyr(*t*Bu)-TCP-Resin

Fmoc-Tyr(*t*Bu)-trityl-carboxyamidomethyl polystyrene

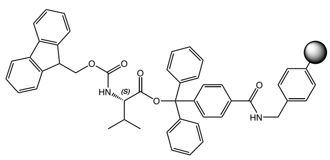
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1080 Fmoc-L-Val-TCP-Resin

Fmoc-Val-trityl-carboxyamidomethyl polystyrene

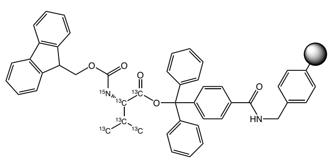
Mesh Size	200-400 mesh
Loading	0.3-0.8 mmol/g
DVB	1% DVB



TCP1300 Fmoc-L-Val-[13C5,15N]-TCP-Resin

Fmoc-Val-[13C5,15N]-trityl-carboxyamidomethyl polystyrene

Mesh Size	200-400 mesh
Loading	0.2-0.3 mmol/g
DVB	1% DVB



↑ back to content

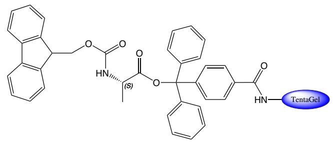
9.2.4. Preloaded Trityl-TentaGel® Resins for the Synthesis of Protected Peptides

Product details

SAL1201 Fmoc-L-Ala-Trt TG

Fmoc-L-Ala-Trityl TentaGel S

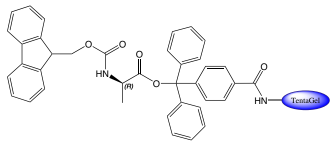
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAD1201 Fmoc-D-Ala-Trt TG

Fmoc-D-Ala-Trityl TentaGel S

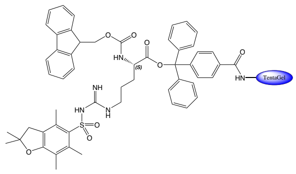
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAL1202 Fmoc-L-Arg(Pbf)-Trt TG

Fmoc-L-Arg(Pbf)-Trityl TentaGel S

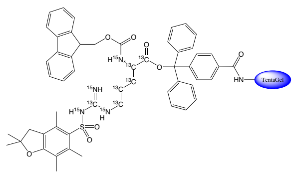
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



RAI1202 Fmoc-L-Arg(Pbf)[13C6;15N4]-Trt TG R

Fmoc-L-Arg(Pbf) (13C6, 99%; 15N4, 99%) TentaGel R TRT Resin

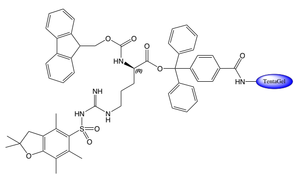
Mesh Size	90 µm
Loading	0.1 - 0.2 mmol/g



SAD1202 Fmoc-D-Arg(Pbf)-Trt TG

Fmoc-D-Arg(Pbf)-Trityl TentaGel S

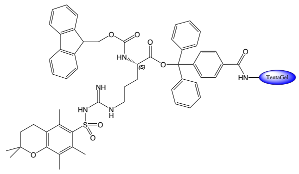
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAL1203 Fmoc-L-Arg(Pmc)-Trt TG

Fmoc-L-Arg(Pmc)-Trityl TentaGel S

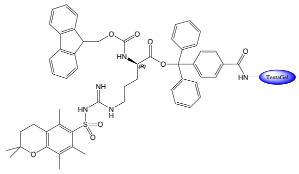
Mesh Size 90 µm
Loading 0.15-0.25 mmol/g



SAD1203 Fmoc-D-Arg(Pmc)-Trt TG

Fmoc-D-Arg(Pmc)-Trityl TentaGel S

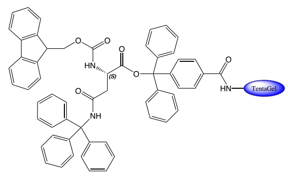
Mesh Size 90 µm
Loading 0.15-0.25 mmol/g



SAL1204 Fmoc-L-Asn(Trt)-Trt TG

Fmoc-L-Asn(Trt)-Trityl TentaGel S

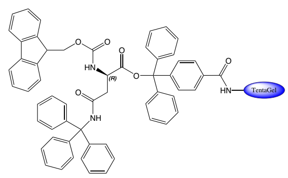
Mesh Size 90 µm
Loading 0.15-0.25 mmol/g



SAD1204 Fmoc-D-Asn(Trt)-Trt TG

Fmoc-D-Asn(Trt)-Trityl TentaGel S

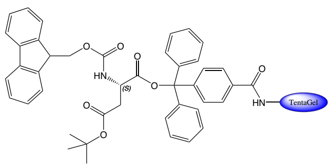
Mesh Size 90 µm
Loading 0.15-0.25 mmol/g



SAL1205 Fmoc-L-Asp(O*t*Bu)-Trt TG

Fmoc-L-Asp(OtBu)-Trityl TentaGel S

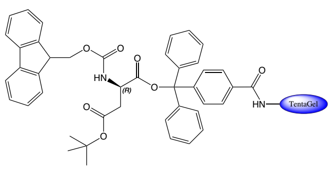
Mesh Size 90 µm
Loading 0.15-0.25 mmol/g



SAD1205 Fmoc-D-Asp(O*t*Bu)-Trt TG

Fmoc-D-Asp(OtBu)-Trityl TentaGel S

Mesh Size 90 µm
Loading 0.15-0.25 mmol/g



↑ back to content

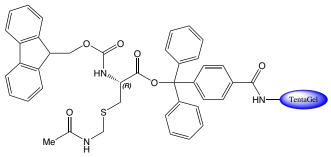
Product details

SAL1207 Fmoc-L-Cys(Acm)-Trt TG

Fmoc-L-Cys(S-Acm)-Trityl TentaGel S

Mesh Size 90 µm

Loading 0.15-0.25 mmol/g

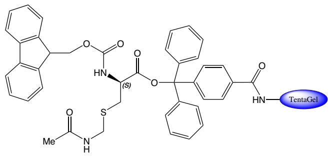


SAD1207 Fmoc-D-Cys(Acm)-Trt TG

Fmoc-D-Cys(S-Acm)-Trityl TentaGel S

Mesh Size 90 µm

Loading 0.15-0.25 mmol/g

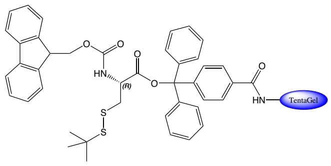


SAL1209 Fmoc-L-Cys(SS-*t*Bu)-Trt TG

Fmoc-L-Cys(S-S-*t*Bu)-Trityl TentaGel S

Mesh Size 90 µm

Loading 0.15-0.25 mmol/g

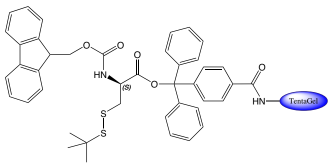


SAD1209 Fmoc-D-Cys(SS-*t*Bu)-Trt TG

Fmoc-D-Cys(S-S-*t*Bu)-Trityl TentaGel S

Mesh Size 90 µm

Loading 0.15-0.25 mmol/g

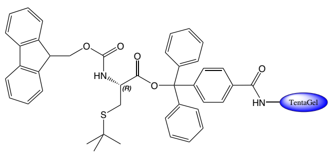


SAL1208 Fmoc-L-Cys(S-*t*Bu)-Trt TG

Fmoc-L-Cys(S-*t*Bu)-Trityl TentaGel S

Mesh Size 90 µm

Loading 0.15-0.25 mmol/g

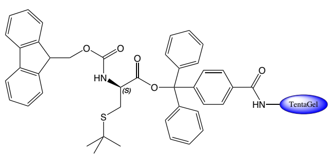


SAD1208 Fmoc-D-Cys(S-*t*Bu)-Trt TG

Fmoc-D-Cys(S-*t*Bu)-Trityl TentaGel S

Mesh Size 90 µm

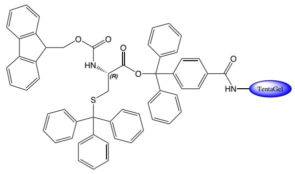
Loading 0.15-0.25 mmol/g



SAL1206 Fmoc-L-Cys(Trt)-Trt TG

Fmoc-L-Cys(Trt)-Trityl TentaGel S

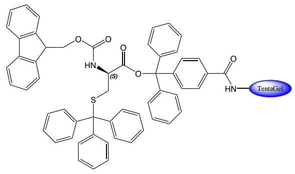
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAD1206 Fmoc-D-Cys(Trt)-Trt TG

Fmoc-D-Cys(Trt)-Trityl TentaGel S

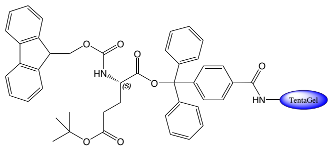
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAL1212 Fmoc-L-Glu(O*t*Bu)-Trt TG

Fmoc-L-Glu(O*t*Bu)-Trityl TentaGel S

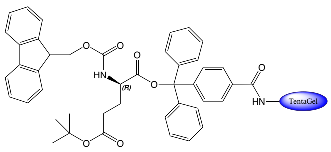
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAD1212 Fmoc-D-Glu(O*t*Bu)-Trt TG

Fmoc-D-Glu(O*t*Bu)-Trityl TentaGel S

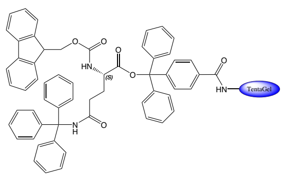
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAL1210 Fmoc-L-Gln(Trt)-Trt TG

Fmoc-L-Gln(Trt)-Trityl TentaGel S

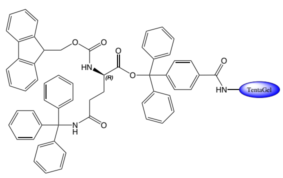
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAD1210 Fmoc-D-Gln(Trt)-Trt TG

Fmoc-D-Gln(Trt)-Trityl TentaGel S

Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

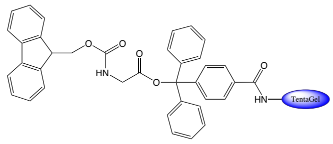
↑ back to content

Product details

SAL1213 Fmoc-Gly-Trt TG

Fmoc-Gly-Trityl TentaGel S

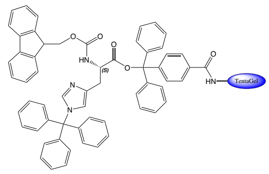
Mesh Size 90 µm
Loading 0.15-0.25 mmol/g



SAL1214 Fmoc-L-His(Trt)-Trt TG

Fmoc-L-His(Trt)-Trityl TentaGel S

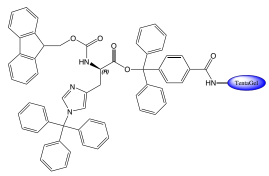
Mesh Size 90 µm
Loading 0.15-0.25 mmol/g



SAD1214 Fmoc-D-His(Trt)-Trt TG

Fmoc-D-His(Trt)-Trityl TentaGel S

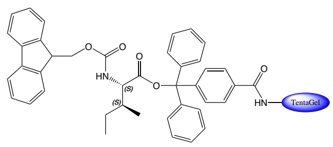
Mesh Size 90 µm
Loading 0.15-0.25 mmol/g



SAL1215 Fmoc-L-Ile-Trt TG

Fmoc-L-Ile-Trityl TentaGel S

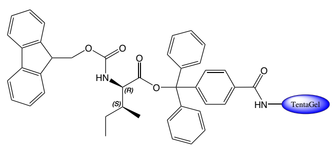
Mesh Size 90 µm
Loading 0.15-0.25 mmol/g



SAD1215 Fmoc-D-Ile-Trt TG

Fmoc-D-Ile-Trityl TentaGel S

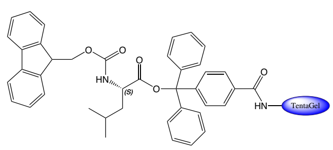
Mesh Size 90 µm
Loading 0.15-0.25 mmol/g



SAL1216 Fmoc-L-Leu-Trt TG

Fmoc-L-Leu-Trityl TentaGel S

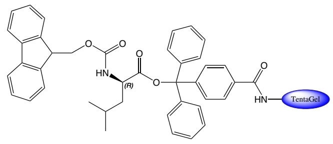
Mesh Size 90 µm
Loading 0.15-0.25 mmol/g



SAD1216 Fmoc-D-Leu-Trt TG

Fmoc-D-Leu-Trityl TentaGel S

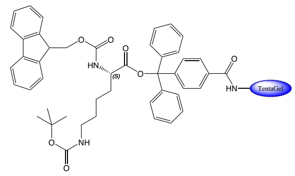
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAL1217 Fmoc-L-Lys(Boc)-Trt TG

Fmoc-L-Lys(Boc)-Trityl TentaGel S

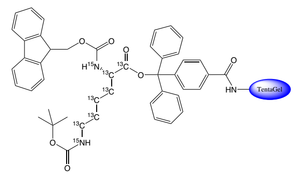
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



RAI1217 Fmoc-L-Lys(Boc)[13C6;15N2]-Trt TG R

Fmoc-L-Lys(Boc) (13C6, 99%; 15N2, 99%) TentaGel R TRT Resin

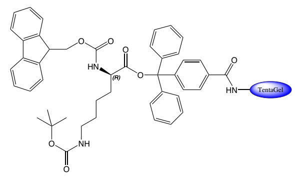
Mesh Size	90 µm
Loading	0.1 - 0.2 mmol/g



SAD1217 Fmoc-D-Lys(Boc)-Trt TG

Fmoc-D-Lys(Boc)-Trityl TentaGel S

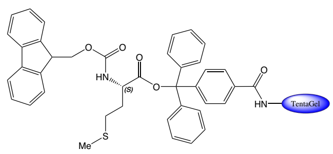
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAL1218 Fmoc-L-Met-Trt TG

Fmoc-L-Met-Trityl TentaGel S

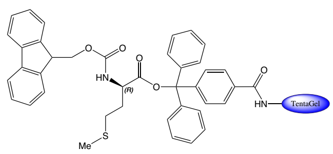
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAD1218 Fmoc-D-Met-Trt TG

Fmoc-D-Met-Trityl TentaGel S

Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



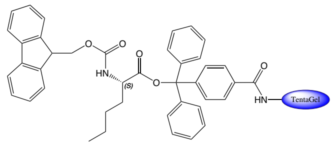
↑ back to content

Product details

SAL1219 Fmoc-L-Nle-Trt TG

Fmoc-L-Nle-Trityl TentaGel S

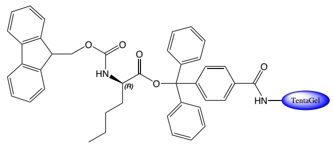
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAD1219 Fmoc-D-Nle-Trt TG

Fmoc-D-Nle-Trityl TentaGel S

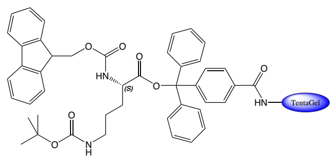
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAL1220 Fmoc-L-Orn(Boc)-Trt TG

Fmoc-L-Orn(Boc)-Trityl TentaGel S

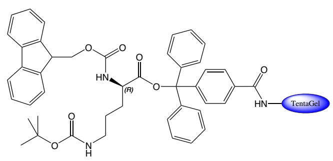
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAD1220 Fmoc-D-Orn(Boc)-Trt TG

Fmoc-D-Orn(Boc)-Trityl TentaGel S

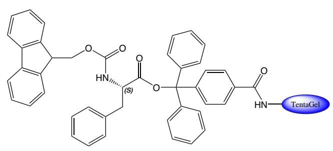
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAL1221 Fmoc-L-Phe-Trt TG

Fmoc-L-Phe-Trityl TentaGel S

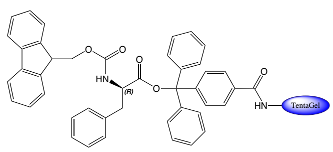
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAD1221 Fmoc-D-Phe-Trt TG

Fmoc-D-Phe-Trityl TentaGel S

Mesh Size	90 µm
Loading	0.15-0.25 mmol/g

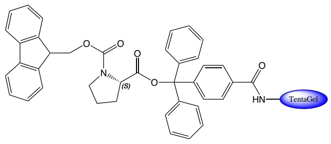


Product details

SAL1222 Fmoc-L-Pro-Trt TG

Fmoc-L-Pro-Trityl TentaGel S

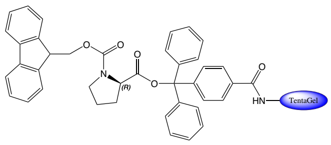
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAD1222 Fmoc-D-Pro-Trt TG

Fmoc-D-Pro-Trityl TentaGel S

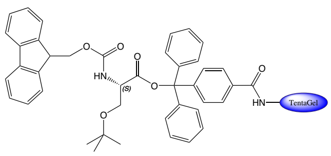
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAL1223 Fmoc-L-Ser(*t*Bu)-Trt TG

Fmoc-L-Ser(*t*Bu)-Trityl TentaGel S

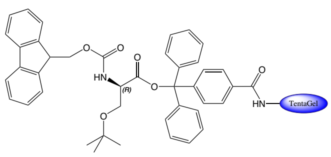
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAD1223 Fmoc-D-Ser(*t*Bu)-Trt TG

Fmoc-D-Ser(*t*Bu)-Trityl TentaGel S

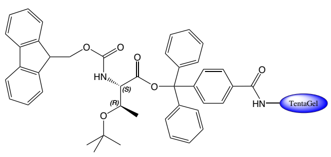
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAL1224 Fmoc-L-Thr(*t*Bu)-Trt TG

Fmoc-L-Thr(*t*Bu)-Trityl TentaGel S

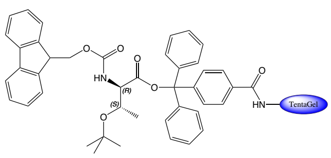
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAD1224 Fmoc-D-Thr(*t*Bu)-Trt TG

Fmoc-D-Thr(*t*Bu)-Trityl TentaGel S

Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



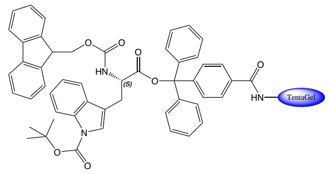
↑ back to content

Product details

SAL1228 Fmoc-L-Trp(Boc)-Trt TG

Fmoc-L-Trp(Boc)-Trityl TentaGel S

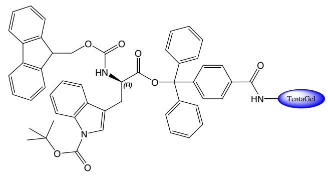
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAD1228 Fmoc-D-Trp(Boc)-Trt TG

Fmoc-D-Trp(Boc)-Trityl TentaGel S

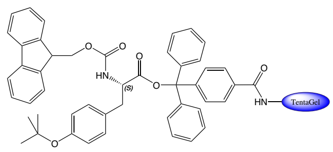
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAL1226 Fmoc-L-Tyr(*t*Bu)-Trt TG

Fmoc-L-Tyr(*t*Bu)-Trityl TentaGel S

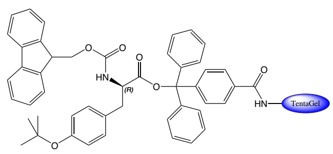
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAD1226 Fmoc-D-Tyr(*t*Bu)-Trt TG

Fmoc-D-Tyr(*t*Bu)-Trityl TentaGel S

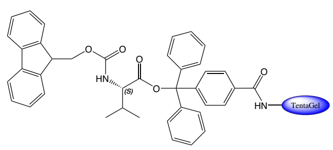
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAL1227 Fmoc-L-Val-Trt TG

Fmoc-L-Val-Trityl TentaGel S

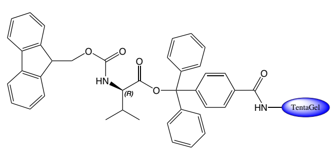
Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



SAD1227 Fmoc-D-Val-Trt TG

Fmoc-D-Val-Trityl TentaGel S

Mesh Size	90 µm
Loading	0.15-0.25 mmol/g



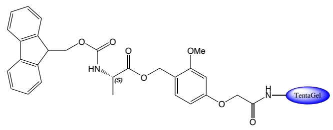
9.2.5. Preloaded AC-TentaGel® Resins for the Synthesis of Protected Peptides

Product details

SAL1101 Fmoc-L-Ala-AC TG

Fmoc-L-Ala-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

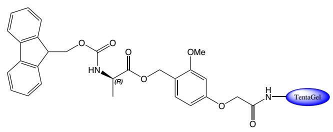
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1101 Fmoc-D-Ala-AC TG

Fmoc-D-Ala-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

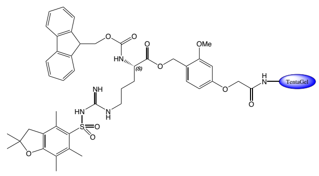
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1102 Fmoc-L-Arg(Pbf)-AC TG

Fmoc-L-Arg(Pbf)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

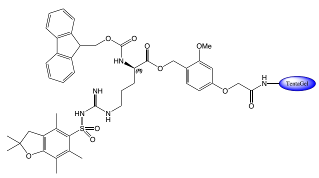
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1102 Fmoc-D-Arg(Pbf)-AC TG

Fmoc-D-Arg(Pbf)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

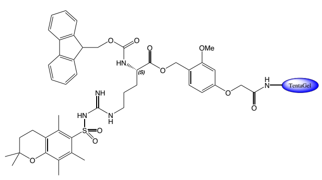
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1103 Fmoc-L-Arg(Pmc)-AC TG

Fmoc-L-Arg(Pmc)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



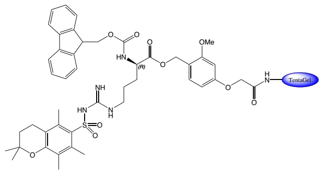
back to content

Product details

SAD1103 Fmoc-D-Arg(Pmc)-AC TG

Fmoc-D-Arg(Pmc)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

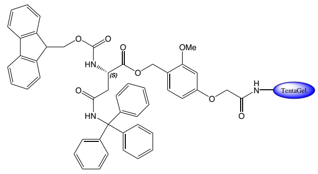
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1104 Fmoc-L-Asn(Trt)-AC TG

Fmoc-L-Asn(Trt)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

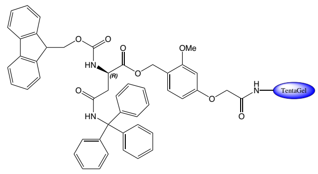
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1104 Fmoc-D-Asn(Trt)-AC TG

Fmoc-D-Asn(Trt)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

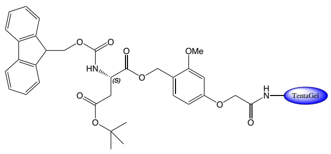
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1105 Fmoc-L-Asp(O*t*Bu)-AC TG

Fmoc-L-Asp(OtBu)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

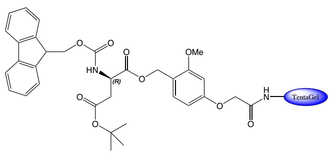
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1105 Fmoc-D-Asp(O*t*Bu)-AC TG

Fmoc-D-Asp(OtBu)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

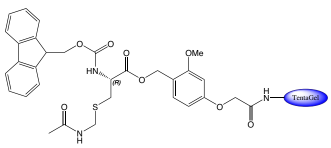
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1107 Fmoc-L-Cys(Acm)-AC TG

Fmoc-L-Cys(S-Acm)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

Mesh Size	90 µm
Loading	0.16-0.26 mmol/g

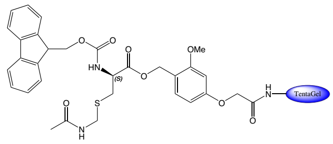


Product details

SAD1107 Fmoc-D-Cys(Acm)-AC TG

Fmoc-D-Cys(S-Acm)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

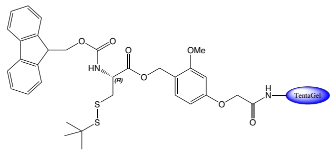
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1109 Fmoc-L-Cys(SS-*t*Bu)-AC TG

Fmoc-L-Cys(S-S-*t*Bu)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

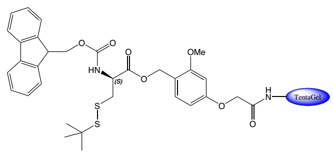
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1109 Fmoc-D-Cys(SS-*t*Bu)-AC TG

Fmoc-D-Cys(S-S-*t*Bu)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

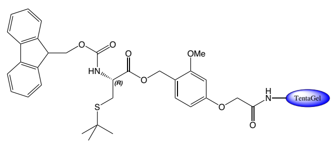
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1108 Fmoc-L-Cys(S-*t*Bu)-AC TG

Fmoc-L-Cys(S-*t*Bu)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

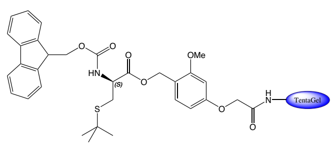
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1108 Fmoc-D-Cys(S-*t*Bu)-AC TG

Fmoc-D-Cys(S-*t*Bu)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

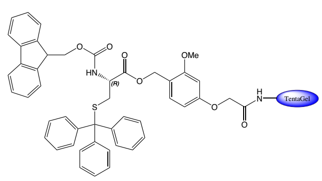
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1106 Fmoc-L-Cys(Trt)-AC TG

Fmoc-L-Cys(Trt)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



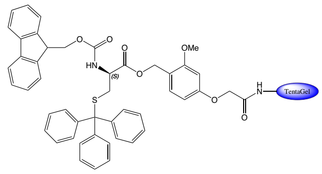
↑ back to content

Product details

SAD1106 Fmoc-D-Cys(Trt)-AC TG

Fmoc-D-Cys(Trt)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

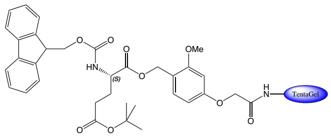
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1112 Fmoc-L-Glu(O*t*Bu)-AC TG

Fmoc-L-Glu(O*t*Bu)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

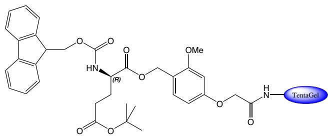
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1112 Fmoc-D-Glu(O*t*Bu)-AC TG

Fmoc-D-Glu(O*t*Bu)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

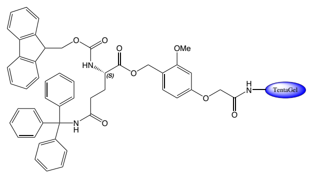
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1110 Fmoc-L-Gln(Trt)-AC TG

Fmoc-L-Gln(Trt)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

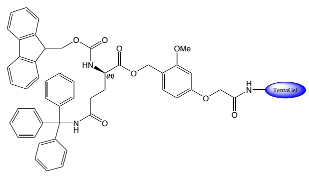
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1110 Fmoc-D-Gln(Trt)-AC TG

Fmoc-D-Gln(Trt)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

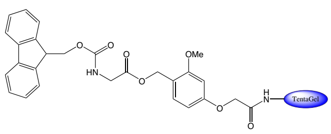
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1113 Fmoc-Gly-AC TG

Fmoc-Gly-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

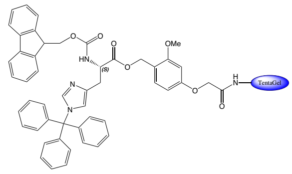
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



Product details

SAL1114 Fmoc-L-His(Trt)-AC TG

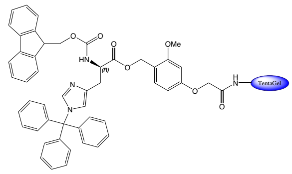
Fmoc-L-His(Trt)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S



Mesh Size	90 µm
Loading	0.16-0.26 mmol/g

SAD1114 Fmoc-D-His(Trt)-AC TG

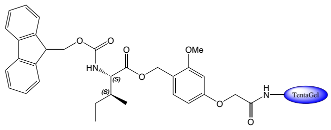
Fmoc-D-His(Trt)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S



Mesh Size	90 µm
Loading	0.16-0.26 mmol/g

SAL1115 Fmoc-L-Ile-AC TG

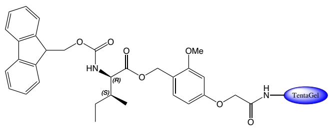
Fmoc-L-Ile-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S



Mesh Size	90 µm
Loading	0.16-0.26 mmol/g

SAD1115 Fmoc-D-Ile-AC TG

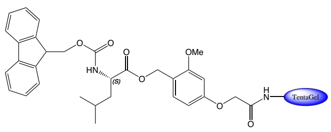
Fmoc-D-Ile-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S



Mesh Size	90 µm
Loading	0.16-0.26 mmol/g

SAL1116 Fmoc-L-Leu-AC TG

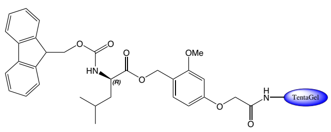
Fmoc-L-Leu-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S



Mesh Size	90 µm
Loading	0.16-0.26 mmol/g

SAD1116 Fmoc-D-Leu-AC TG

Fmoc-D-Leu-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S



Mesh Size	90 µm
Loading	0.16-0.26 mmol/g

Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

↑ back to content

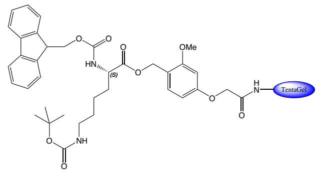
Product details

SAL1117 Fmoc-L-Lys(Boc)-AC TG

Fmoc-L-Lys(Boc)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

Mesh Size 90 µm

Loading 0.16-0.26 mmol/g

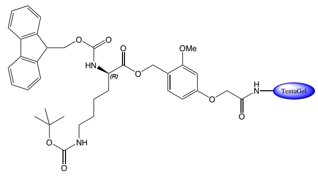


SAD1117 Fmoc-D-Lys(Boc)-AC TG

Fmoc-D-Lys(Boc)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

Mesh Size 90 µm

Loading 0.16-0.26 mmol/g

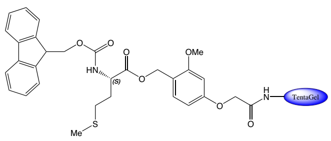


SAL1118 Fmoc-L-Met-AC TG

Fmoc-L-Met-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

Mesh Size 90 µm

Loading 0.16-0.26 mmol/g

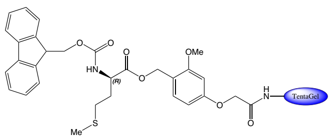


SAD1118 Fmoc-D-Met-AC TG

Fmoc-D-Met-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

Mesh Size 90 µm

Loading 0.16-0.26 mmol/g

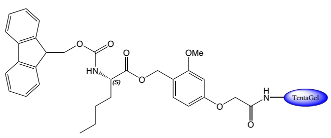


SAL1119 Fmoc-L-Nle-AC TG

Fmoc-L-Nle-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

Mesh Size 90 µm

Loading 0.16-0.26 mmol/g

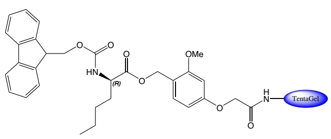


SAD1119 Fmoc-D-Nle-AC TG

Fmoc-D-Nle-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

Mesh Size 90 µm

Loading 0.16-0.26 mmol/g

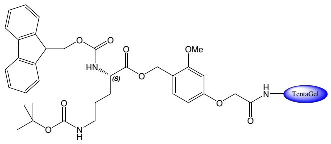


Product details

SAL1120 Fmoc-L-Orn(Boc)-AC TG

Fmoc-L-Orn(Boc)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

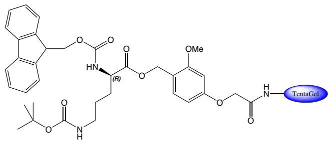
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAD1120 Fmoc-D-Orn(Boc)-AC TG

Fmoc-D-Orn(Boc)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

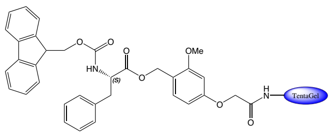
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAL1121 Fmoc-L-Phe-AC TG

Fmoc-L-Phe-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

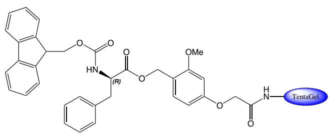
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAD1121 Fmoc-D-Phe-AC TG

Fmoc-D-Phe-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

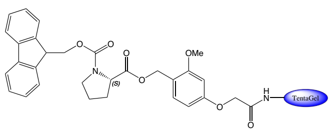
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAL1122 Fmoc-L-Pro-AC TG

Fmoc-L-Pro-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

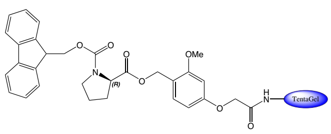
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAD1122 Fmoc-D-Pro-AC TG

Fmoc-D-Pro-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



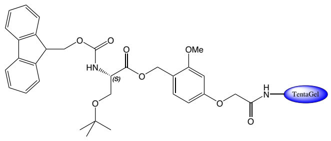
↑ back to content

Product details

SAL1123 Fmoc-L-Ser(*t*Bu)-AC TG

Fmoc-L-Ser(*t*Bu)-[3-methoxy-4-hydroxymethyl)phen-oxyacetylamid] TentaGel S

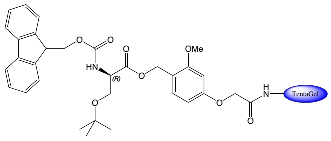
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAD1123 Fmoc-D-Ser(*t*Bu)-AC TG

Fmoc-D-Ser(*t*Bu)-[3-methoxy-4-hydroxymethyl)phen-oxyacetylamid] TentaGel S

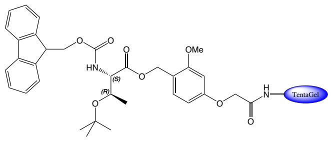
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAL1124 Fmoc-L-Thr(*t*Bu)-AC TG

Fmoc-L-Thr(*t*Bu)-[3-methoxy-4-hydroxymethyl)phen-oxyacetylamid] TentaGel S

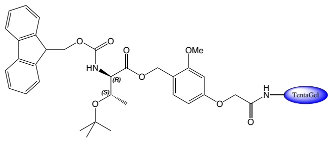
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAD1124 Fmoc-D-Thr(*t*Bu)-AC TG

Fmoc-D-Thr(*t*Bu)-[3-methoxy-4-hydroxymethyl)phen-oxyacetylamid] TentaGel S

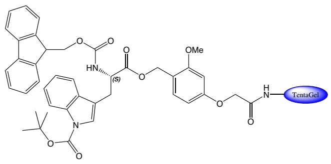
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAL1128 Fmoc-L-Trp(Boc)-AC TG

Fmoc-L-Trp(Boc)-[3-methoxy-4-hydroxymethyl)phen-oxyacetylamid] TentaGel S

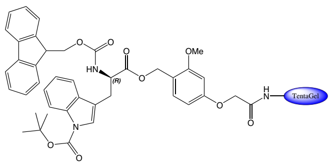
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAD1128 Fmoc-D-Trp(Boc)-AC TG

Fmoc-D-Trp(Boc)-[3-methoxy-4-hydroxymethyl)phen-oxyacetylamid] TentaGel S

Mesh Size 90 µm
Loading 0.16-0.26 mmol/g

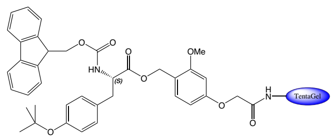


Product details

SAL1126 Fmoc-L-Tyr(*t*Bu)-AC TG

Fmoc-L-Tyr(*t*Bu)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

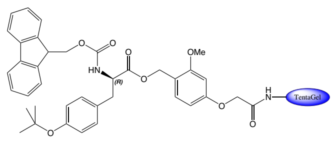
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1126 Fmoc-D-Tyr(*t*Bu)-AC TG

Fmoc-D-Tyr(*t*Bu)-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

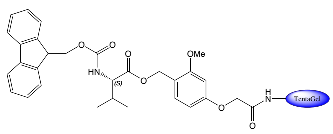
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1127 Fmoc-L-Val-AC TG

Fmoc-L-Val-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

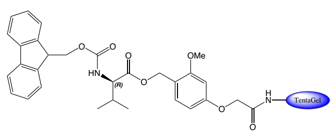
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1127 Fmoc-D-Val-AC TG

Fmoc-D-Val-[3-methoxy-4-hydroxymethyl)phenoxyacetylamid] TentaGel S

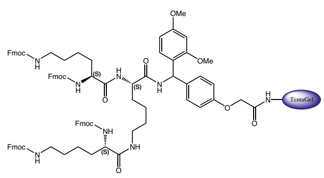
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL2023 $(Fmoc)_4$-Lys_2-Lys-Rink TG

$(Fmoc)_4$-Lys_2-Lys-Rink TG

Loading	0.3-0.6 mmole/g



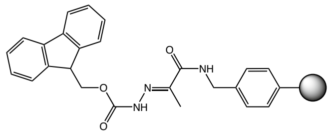
↑ back to content

9.2.6. Hydrazone Resins for the Synthesis of Peptide Thio Esters and Native Chemical Ligation

Product details

PYV1000 Fmoc-NHN=Pyv Resin

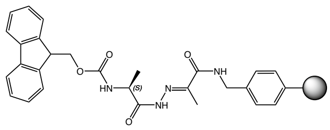
Fmoc-hydrazono-pyruvyl-aminomethylpolystyrene resin



Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB

PYV1100 Fmoc-L-Ala-NHN=Pyv Resin

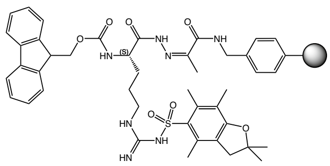
Fmoc-L-alanyl-hydrazono-pyruvyl-aminomethylpolystyrene resin



Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB

PYV1110 Fmoc-L-Arg(Pbf)-NHN=Pyv Resin

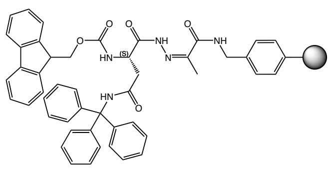
Fmoc-*N*'-2,2,4,6,7-pentamethyldihydrobenzofuran-5-sulfonyl-L-arginyl-hydrazono-pyruvyl-aminomethylpolystyrene resin



Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB

PYV1120 Fmoc-L-Asn(Trt)-NHN=Pyv Resin

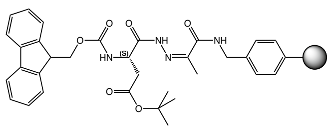
Fmoc-N-beta-trityl-L-asparaginyl-hydrazono-pyruvyl-aminomethylpolystyrene resin



Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB

PYV1130 Fmoc-L-Asp(O*t*Bu)-NHN=Pyv Resin

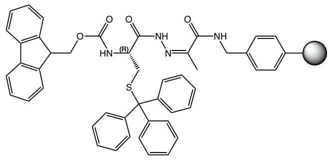
Fmoc-L-aspartyl-beta-*t*-butyl ester-alpha-hydrazono-pyruvyl-aminomethylpolystyrene resin



Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB

PYV1140 Fmoc-L-Cys(Trt)-NHN=Pyv Resin

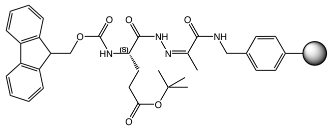
Fmoc-S-trityl-L-cysteinyl-hydrazono-pyruvyl-amino-methylpolystyrene resin



Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB

PYV1150 Fmoc-L-Glu(*t*Bu)-NHN=Pyv Resin

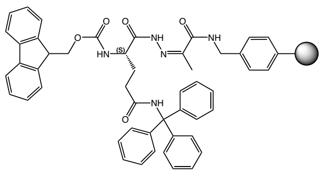
Fmoc-L-glutamyl-gamma-*t*-butyl ester-alpha-hydrazono-pyruvyl-aminomethylpolystyrene resin



Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB

PYV1160 Fmoc-L-Gln(Trt)-NHN=Pyv Resin

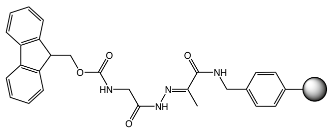
Fmoc-N-gamma-trityl-L-glutaminyl-hydrazono-pyruvyl-aminomethylpolystyrene resin



Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB

PYV1170 Fmoc-Gly-NHN=Pyv Resin

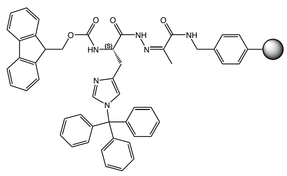
Fmoc-glycyl-hydrazono-pyruvyl-aminomethylpolystyrene resin



Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB

PYV1180 Fmoc-L-His(Trt)-NHN=Pyv Resin

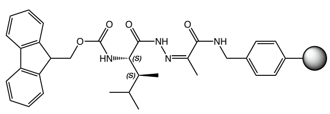
Fmoc-N-trityl-L-histidyl-hydrazono-pyruvyl-amino-methylpolystyrene resin



Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB

PYV1190 Fmoc-L-Ile-NHN=Pyv Resin

Fmoc-L-isoleucyl-hydrazono-pyruvyl-aminomethylpolystyrene resin



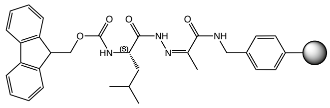
Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB

↑ back to content

Product details

PYV1200 Fmoc-L-Leu-NHN=Pyv Resin

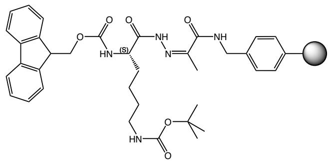
Fmoc-L-leucyl-hydrazono-pyruvyl-aminomethylpolystyrene resin



Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB

PYV1210 Fmoc-L-Lys(Boc)-NHN=Pyv Resin

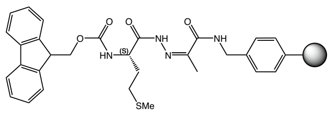
Fmoc-N-epsilon-*t*-butyloxycarbonyl-L-lysyl-hydrazono-pyruvyl-aminomethylpolystyrene resin



Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB

PYV1220 Fmoc-L-Met-NHN=Pyv Resin

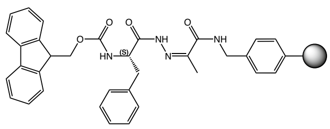
Fmoc-L-methionyl-hydrazono-pyruvyl-aminomethylpolystyrene resin



Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB

PYV1230 Fmoc-L-Phe-NHN=Pyv Resin

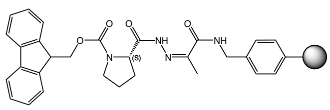
Fmoc-L-phenylalanyl-hydrazono-pyruvyl-aminomethylpolystyrene resin



Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB

PYV1240 Fmoc-L-Pro-NHN=Pyv Resin

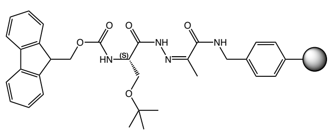
Fmoc-L-prolinyl-hydrazono-pyruvyl-aminomethylpolystyrene resin



Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB

PYV1250 Fmoc-L-Ser(*t*Bu)-NHN=Pyv Resin

Fmoc-O-*t*-butyl-L-seryl-hydrazono-pyruvyl-aminomethylpolystyrene resin

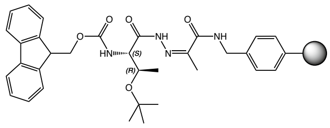


Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB

PYV1260 Fmoc-L-Thr(*t*Bu)-NHN=Pyv Resin

Fmoc-O-*t*-butyl-L-threonyl-hydrazono-pyruvyl-amino-methylpolystyrene resin

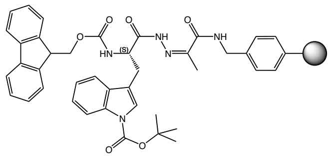
Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB



PYV1270 Fmoc-L-Trp(Boc)-NHN=Pyv Resin

Fmoc-N-*t*-butyloxycarbonyl-L-tryptophyl-hydrazono-pyruvyl-aminomethylpolystyrene resin

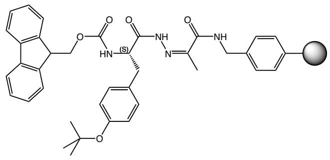
Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB



PYV1280 Fmoc-L-Tyr(*t*Bu)-NHN=Pyv Resin

Fmoc-O-*t*-butyl-L-tyrosyl-hydrazono-pyruvyl-amino-methylpolystyrene resin

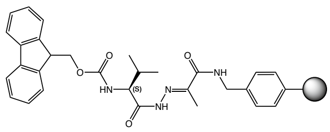
Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB



PYV1290 Fmoc-L-Val-NHN=Pyv Resin

Fmoc-L-valyl-hydrazono-pyruvyl-aminomethylpolystyrene resin

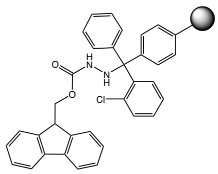
Mesh Size	100-200 mesh
Loading	> 0.3 mmol/g
DVB	1% DVB



BR-5279 Fmoc-NHNH-2CT Resin

Fmoc-hydrazine-2-chlorotrityl resin

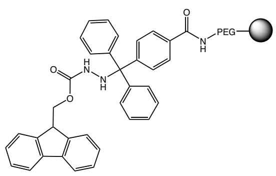
Mesh Size	100-200 mesh
Loading	0,4-1,4 mmol/g
DVB	1% DVB



BR-5280 Fmoc-NHNH-Trt-PEG Resin

Fmoc-hydrazine-trityl polyethyleneglycol resin

Loading	0,10-0,30 mmol/g
DVB	1% DVB



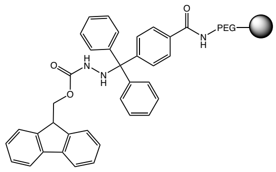
back to content

Product details

PEG8260 Fmoc-NHNH-Trt-PEG Resin HL

Fmoc-hydrazine-trityl polyethyleneglycol resin

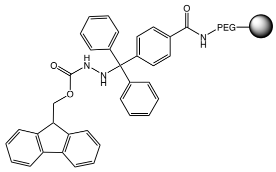
Mesh Size	75 µm
Loading	0,3 - 0,5 mmol/g
DVB	1%



PEG8265 Fmoc-NHNH-Trt-PEG Resin XV

Fmoc-hydrazine-trityl polyethyleneglycol resin

Mesh Size	100-200 µm
Loading	0,1 - 0,3 mmol/g



References:

- → *Convenient method of peptide hydrazide synthesis using a new hydrazone resin; Pavel S. Chelushkin, Ksenia V. Polyanichko, Maria V. Leko, Marina Yu. Dorosh, Thomas Bruckdorfer, Sergey V. Burov;* ***Tetrahedron Lett.*** *2015;* ***56****: 619–622.* *https://doi.org/10.1016/j.tetlet.2014.12.056*
- → *A shelf stable Fmoc hydrazine resin for the synthesis of peptide hydrazides; M. J. Bird, P. E. Dawson;* ***Pept. Sci.*** *2022;* ***114(5)****: e24268.* *https://doi.org/10.1002/pep2.24268*

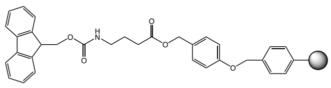
9.2.7. Preloaded Wang Resins and Wang-type Linkers

Product details

WAA2630 Fmoc-4-Abu-Wang Resin

Fmoc-4-Aminobutyric acid-Wang Resin

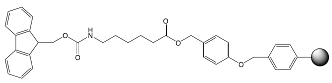
Mesh Size	100-200 mesh
DVB	1% DVB



WAA5129 Fmoc-Ahx Wang Resin

Fmoc-6-Aminohexanoic acid-Wang Resin

Mesh Size	100-200 mesh
DVB	1% DVB

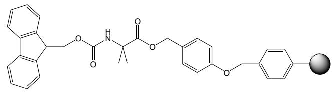


Product details

WAA5139 Fmoc-Aib-Wang Resin

Fmoc-Aminoisobutyric acid-Wang Resin

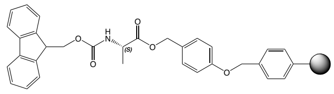
Mesh Size	100-200 mesh
DVB	1% DVB



WAA11301 Fmoc-L-Ala-Wang Resin

Fmoc-L-alanin-4-benzyloxybenzylester polymer

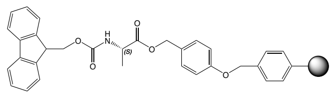
Mesh Size	100-200 mesh
Loading	0.35 - 1.3 mmol/g
DVB	1% DVB



WAA11301LL Fmoc-L-Ala-Wang Resin

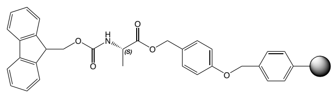
Fmoc-L-alanin-4-benzyloxybenzylester polymer

Mesh Size	100-200 mesh
Loading	0.2 - 0.35 mmol/g
DVB	1% DVB



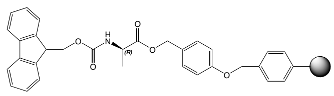
WAA41301 Fmoc-L-Ala-Wang Resin

Mesh Size	200-400 mesh
DVB	1% DVB



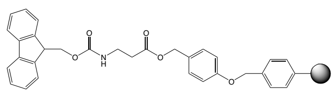
RAA2001 Fmoc-D-Ala-Wang Resin

Mesh Size	100-200 mesh
DVB	1% DVB



WAA5101 Fmoc-beta-Ala-Wang Resin

Mesh Size	100-200 mesh
DVB	1% DVB

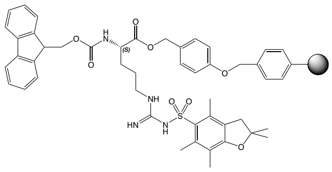


↑ back to content

Product details

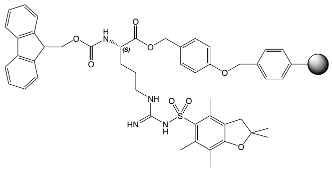
WAA11302 Fmoc-L-Arg(Pbf)-Wang Resin

Mesh Size	100-200 mesh
Loading	0.4 - 0.9 mmol/g
DVB	1% DVB



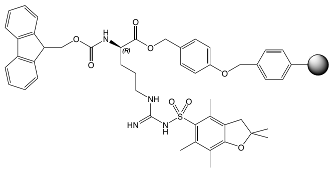
WAA41302 Fmoc-L-Arg(Pbf)-Wang Resin

Mesh Size	200-400 mesh
DVB	1% DVB



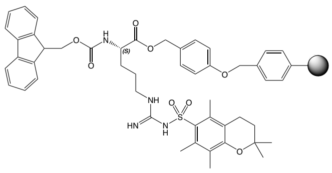
WAA6109 Fmoc-D-Arg(Pbf)-Wang Resin

Mesh Size	100-200 mesh
DVB	1% DVB



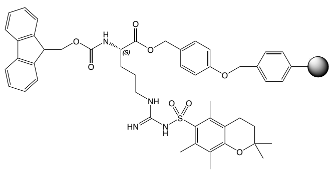
WAA11303 Fmoc-L-Arg(Pmc)-Wang resin

Mesh Size	100-200 mesh
DVB	1% DVB



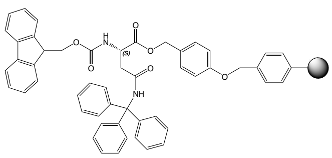
WAA41303 Fmoc-L-Arg(Pmc)-Wang Resin

Mesh Size	200-400 mesh
DVB	1% DVB



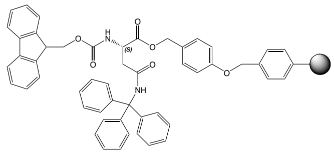
WAA11304 Fmoc-L-Asn(Trt)-Wang Resin

Mesh Size	100-200 mesh
DVB	1% DVB



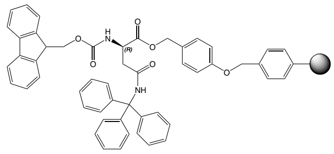
WAA41304 Fmoc-L-Asn(Trt)-Wang Resin

Mesh Size 200-400 mesh
DVB 1% DVB



WAA6108 Fmoc-D-Asn(Trt)-Wang Resin

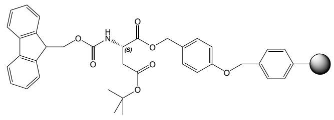
Mesh Size 100-200 mesh
DVB 1% DVB



WAA11305 Fmoc-L-Asp(O*t*Bu)-Wang Resin

Fmoc-L-Asp(O*t*Bu)-Wang Resin

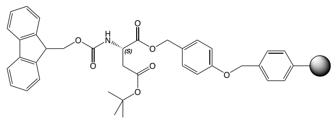
Mesh Size 100-200 mesh
DVB 1% DVB



WAA41305 Fmoc-L-Asp(O*t*Bu)-Wang Resin

Fmoc-L-Asp(O*t*Bu)-Wang Resin

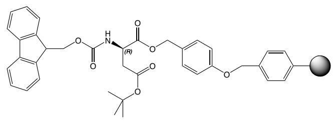
Mesh Size 200-400 mesh
DVB 1% DVB



WAA6110 Fmoc-D-Asp(*t*Bu)-Wang Resin

Fmoc-D-Asp(OBut)-Wang Resin

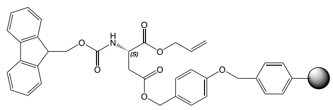
Mesh Size 100-200 mesh
DVB 1% DVB



CAA1002 Fmoc-L-Asp(Wang-Resin)-OAll

N-alpha-(9-Fluorenylmethyloxycarbonyl)-L-As-p(Wang-Resin)-OAll

Mesh Size 100-200 mesh
Loading 0.15-0.5 mmol/g
DVB 1% DVB



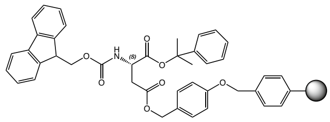
↑ back to content

Resin Guideline

Product details

CAA1010 Fmoc-Asp(Wang Resin)-OPP

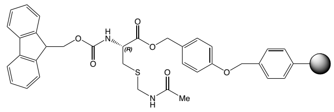
N-alpha-(9-Fluorenylmethyloxycarbonyl)-L-aspartic acid-beta-(Wang-Resin)-alpha-2-phenylisopropyl ester



Mesh Size	100-200 mesh

WAA11307 Fmoc-L-Cys(Acm)-Wang Resin

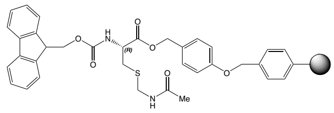
Fmoc-L-Cys(S-Acm)-Wang Resin



Mesh Size	100-200 mesh
DVB	1% DVB

WAA41307 Fmoc-L-Cys(Acm)-Wang Resin

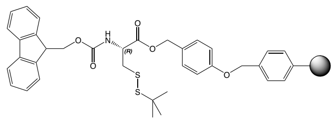
Fmoc-L-Cys(S-Acm)-Wang Resin



Mesh Size	200-400 mesh
DVB	1% DVB

WAA11309 Fmoc-L-Cys(SS-*t*Bu)-Wang Resin

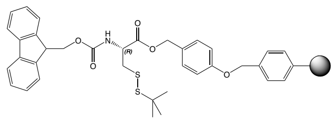
Fmoc-L-Cys(S-S-*t*Bu)-Wang Resin



Mesh Size	100-200 mesh
DVB	1% DVB

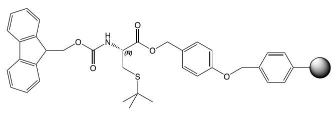
WAA41309 Fmoc-L-Cys(SS-*t*Bu)-Wang Resin

Fmoc-L-Cys(S-S-*t*Bu)-Wang Resin



Mesh Size	200-400 mesh
DVB	1% DVB

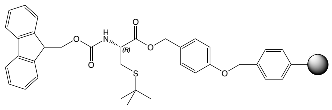
WAA11308 Fmoc-L-Cys(S-*t*Bu)-Wang Resin



Mesh Size	100-200 mesh
DVB	1% DVB

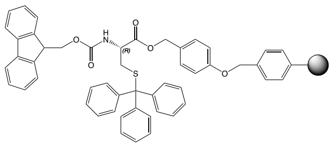
Product details

WAA41308 Fmoc-L-Cys(S-*t*Bu)-Wang Resin



Mesh Size	200-400 mesh
DVB	1% DVB

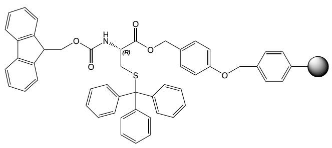
WAA11306 Fmoc-L-Cys(Trt)-Wang Resin



Mesh Size	100-200 mesh
DVB	1% DVB

WAA41306 Fmoc-L-Cys(Trt)-Wang Resin

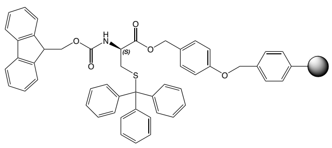
Fmoc-L-Cysteine(Trityl)-Wang Resin



Mesh Size	200-400 mesh
DVB	1% DVB

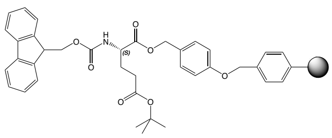
WAA6118 Fmoc-D-Cys(Trt)-Wang Resin

Fmoc-D-Cysteine(Trityl)-Wang Resin



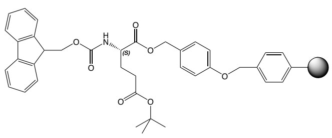
Mesh Size	100-200 mesh
DVB	1% DVB

WAA11312 Fmoc-L-Glu(O*t*Bu)-Wang Resin



Mesh Size	100-200 mesh
DVB	1% DVB

WAA41312 Fmoc-L-Glu(O*t*Bu)-Wang Resin



Mesh Size	200-400 mesh
DVB	1% DVB

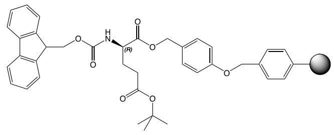
↑ back to content

Product details

WAA6120 Fmoc-D-Glu(O*t*Bu)-Wang Resin

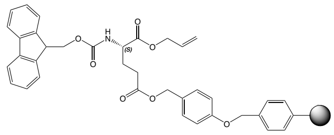
Fmoc-D-Glu(O*t*Bu)-Wang Resin

Mesh Size	100-200 mesh
DVB	1% DVB



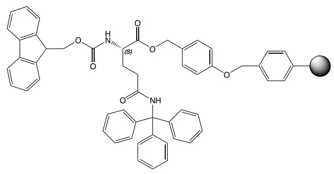
CAA1004 Fmoc-L-Glu(Wang-Resin)-OAll

Mesh Size	100-200 mesh
Loading	0.15-0.5 mmol/g
DVB	1% DVB



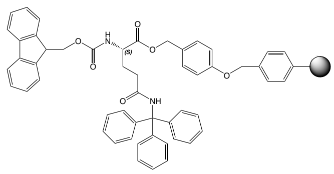
WAA11310 Fmoc-L-Gln(Trt)-Wang Resin

Mesh Size	100-200 mesh
DVB	1% DVB



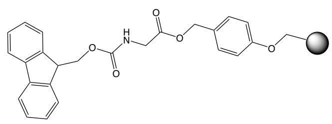
WAA41310 Fmoc-L-Gln(Trt)-Wang Resin

Mesh Size	200-400 mesh
DVB	1% DVB



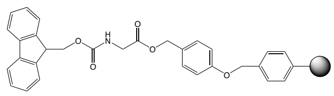
WAA11313 Fmoc-Gly-Wang Resin

Mesh Size	100-200 mesh
DVB	1% DVB

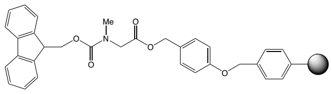


WAA41313 Fmoc-Gly-Wang Resin

Mesh Size	200-400 mesh
DVB	1% DVB



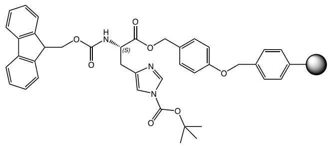
WAA5132 Fmoc-Sar-Wang Resin



Mesh Size	100-200 mesh
DVB	1% DVB

WAA11329 Fmoc-L-His(Boc)-Wang Resin

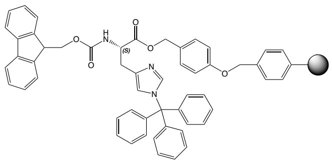
Fmoc-L-Histidine(Boc)-Wang Resin



Mesh Size	100-200 mesh
Loading	0.4 - 0.9 mmol/g
DVB	1%

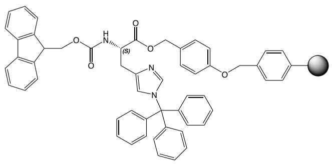
WAA11314 Fmoc-L-His(Trt)-Wang Resin

Fmoc-L-Histidine(Trityl)-Wang Resin



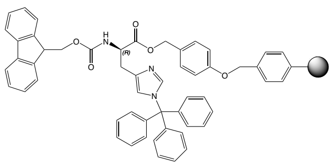
Mesh Size	100-200 mesh
DVB	1% DVB

WAA41314 Fmoc-L-His(Trt)-Wang Resin



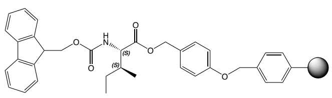
Mesh Size	200-400 mesh
DVB	1% DVB

WAA6136 Fmoc-D-His(Trt)-Wang Resin



Mesh Size	100-200 mesh
DVB	1% DVB

WAA11315 Fmoc-L-Ile-Wang Resin



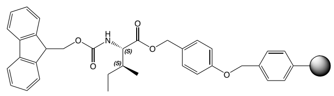
Mesh Size	100-200 mesh
DVB	1% DVB

↑ back to content

Product details

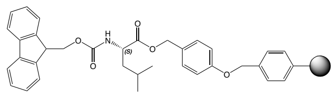
WAA41315 Fmoc-L-Ile-Wang Resin

Mesh Size	200-400 mesh
DVB	1% DVB



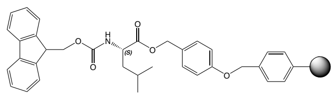
WAA11316 Fmoc-L-Leu-Wang Resin

Mesh Size	100-200 mesh
DVB	1% DVB



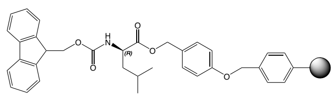
WAA41316 Fmoc-L-Leu-Wang Resin

Mesh Size	200-400 mesh
DVB	1% DVB



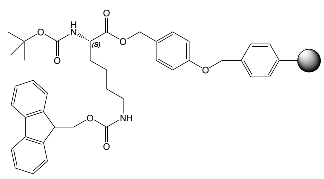
WAA6145 Fmoc-D-Leu-Wang Resin

Mesh Size	100-200 mesh
DVB	1% DVB



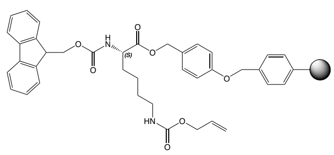
WAA5151 Boc-L-Lys(Fmoc)-Wang Resin

Mesh Size	100-200 mesh
DVB	1% DVB

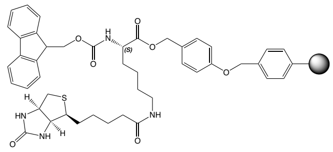


WAA5153 Fmoc-L-Lys(Aloc)-Wang Resin

Mesh Size	100-200 mesh
DVB	1% DVB

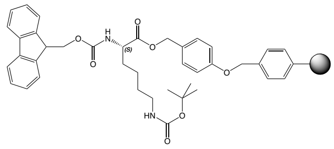


WAA5154 Fmoc-L-Lys(Biotin)-Wang Resin



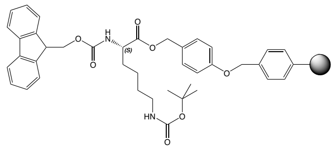
Mesh Size	100-200 mesh
DVB	1% DVB

WAA11317 Fmoc-L-Lys(Boc)-Wang Resin



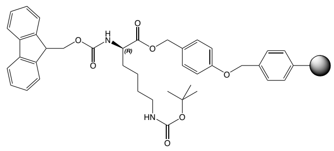
Mesh Size	100-200 mesh
DVB	1% DVB

WAA41317 Fmoc-L-Lys(Boc)-Wang Resin



Mesh Size	200-400 mesh
DVB	1% DVB

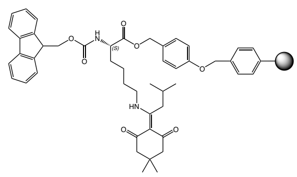
WAA6150 Fmoc-D-Lys(Boc)-Wang Resin



Mesh Size	100-200 mesh
DVB	1% DVB

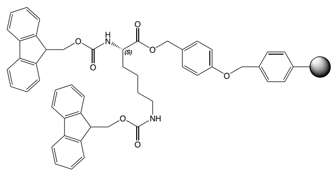
WAA11330 Fmoc-L-Lys(ivDde)-Wang Resin

Fmoc-L-Lysine(ivDde)-Wang Resin



Mesh Size	100-200 mesh
Loading	0.4 - 0.9 mmol/g
DVB	1%

WAA5156 Fmoc-L-Lys(Fmoc) Wang Resin



Mesh Size	100-200 mesh
DVB	1% DVB

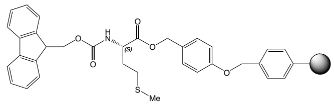
Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

↑ back to content

Product details

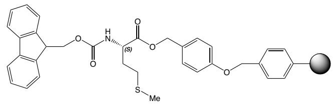
WAA11318 Fmoc-L-Met-Wang Resin

Mesh Size 100-200 mesh
DVB 1% DVB



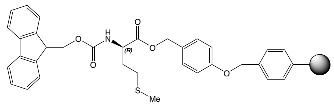
WAA41318 Fmoc-L-Met-Wang Resin

Mesh Size 200-400 mesh
DVB 1% DVB



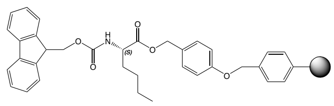
WAA6155 Fmoc-D-Met-Wang Resin

Mesh Size 100-200 mesh
DVB 1% DVB



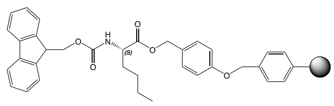
WAA11319 Fmoc-L-Nle-Wang Resin

Mesh Size 100-200 mesh
DVB 1% DVB



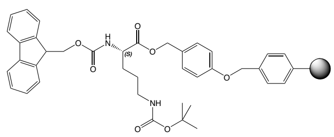
WAA41319 Fmoc-L-Nle-Wang Resin

Mesh Size 200-400 mesh
DVB 1% DVB



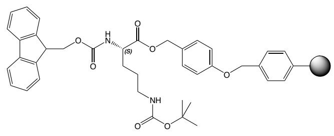
WAA11320 Fmoc-L-Orn(Boc)-Wang Resin

Mesh Size 100-200 mesh
DVB 1% DVB



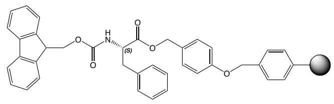
Product details

WAA41320 Fmoc-L-Orn(Boc)-Wang Resin



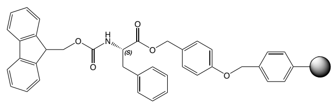
Mesh Size 200-400 mesh
DVB 1% DVB

WAA11321 Fmoc-L-Phe-Wang Resin



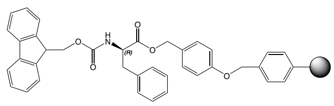
Mesh Size 100-200 mesh
DVB 1% DVB

WAA41321 Fmoc-L-Phe-Wang Resin



Mesh Size 200-400 mesh
DVB 1% DVB

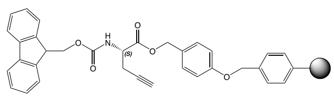
WAA6160 Fmoc-D-Phe-Wang Resin



Mesh Size 100-200 mesh
DVB 1% DVB

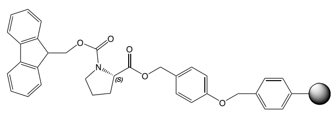
WAA6025 Fmoc-L-Pra-Wang Resin

Fmoc-L-Propargylglycine-Wang Resin



Mesh Size 100-200 mesh
DVB 1% DVB

WAA11322 Fmoc-L-Pro-Wang Resin



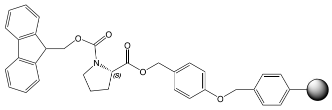
Mesh Size 100-200 mesh
DVB 1% DVB

↑ back to content

Product details

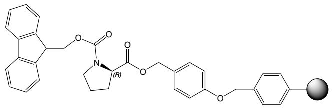
WAA41322 Fmoc-L-Pro-Wang Resin

Mesh Size 200-400 mesh
DVB 1% DVB



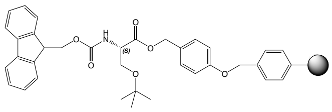
WAA6165 Fmoc-D-Pro-Wang Resin

Mesh Size 100-200 mesh
DVB 1% DVB



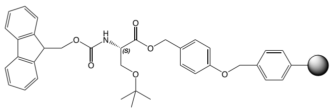
WAA11323 Fmoc-L-Ser(*t*Bu)-Wang Resin

Mesh Size 100-200 mesh
Loading 0.4 - 0.9 mmol/g
DVB 1% DVB



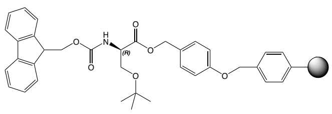
WAA41323 Fmoc-L-Ser(*t*Bu)-Wang Resin

Mesh Size 200-400 mesh
DVB 1% DVB



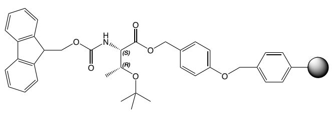
WAA6170 Fmoc-D-Ser(*t*Bu)-Wang Resin

Mesh Size 100-200 mesh
DVB 1% DVB



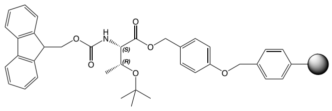
WAA11324 Fmoc-L-Thr(*t*Bu)-Wang Resin

Mesh Size 100-200 mesh
DVB 1% DVB



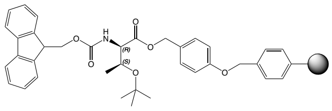
Product details

WAA41324 Fmoc-L-Thr(*t*Bu)-Wang Resin



Mesh Size	200-400 mesh
DVB	1% DVB

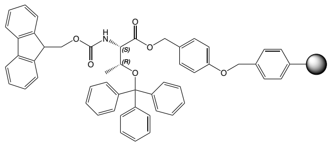
WAA6175 Fmoc-D-Thr(*t*Bu)-Wang Resin



Mesh Size	100-200 mesh
DVB	1% DVB

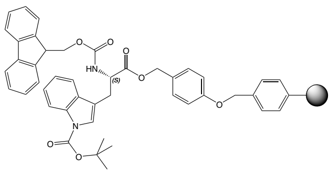
WAA6220 Fmoc-L-Thr(Trt)-Wang Resin

Fmoc-L-Threonine(Trityl)-Wang Resin



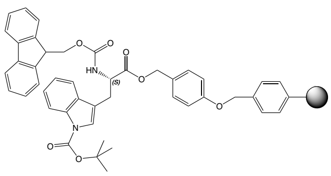
Mesh Size	100-200
DVB	1%

WAA11328 Fmoc-L-Trp(Boc)-Wang Resin



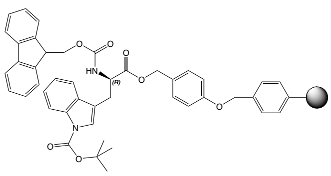
Mesh Size	100-200 mesh
DVB	1% DVB

WAA41328 Fmoc-L-Trp(Boc)-Wang Resin



Mesh Size	200-400 mesh
DVB	1% DVB

WAA6181 Fmoc-D-Trp(Boc)-Wang Resin



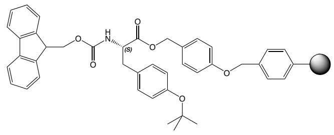
Mesh Size	100-200 mesh
DVB	1% DVB

↑ back to content

Product details

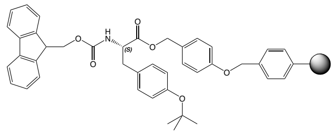
WAA11326 Fmoc-L-Tyr(*t*Bu)-Wang Resin

Mesh Size 100-200 mesh
DVB 1% DVB



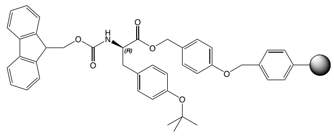
WAA41326 Fmoc-L-Tyr(*t*Bu)-Wang Resin

Mesh Size 200-400 mesh
DVB 1% DVB



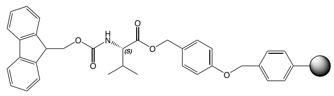
WAA6185 Fmoc-D-Tyr(*t*Bu)-Wang Resin

Mesh Size 100-200 mesh
DVB 1% DVB



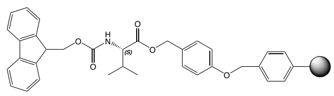
WAA11327 Fmoc-L-Val-Wang Resin

Mesh Size 100-200 mesh
DVB 1% DVB



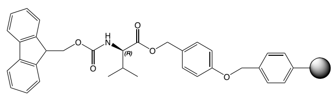
WAA41327 Fmoc-L-Val-Wang Resin

Mesh Size 200-400 mesh
DVB 1% DVB



WAA6190 Fmoc-D-Val-Wang Resin

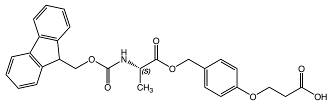
Mesh Size 100-200 mesh
DVB 1% DVB



LW00102 Fmoc-L-Ala-MPPA

N-alpha-(9-Fluorenylmethyloxycarbonyl)-L-alanine-3-(4-oxymethylphenoxy)propionic acid

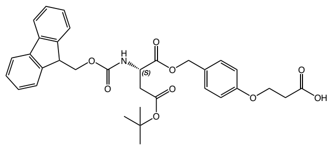
CAS-No.	864876-89-1
Formula	$C_{28}H_{27}NO_7$
Mol. weight	489,52 g/mol



LW00402 Fmoc-L-Asp(O*t*Bu)-MPPA

N-alpha-(9-Fluorenylmethyloxycarbonyl)-L-aspartic acid beta-*t*-butyl ester-3-(4-oxymethylphenoxy)propionic acid

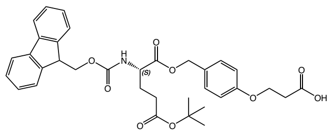
CAS-No.	864876-94-8
Formula	$C_{33}H_{35}NO_9$
Mol. weight	589,64 g/mol



LW00602 Fmoc-L-Glu(O*t*Bu)-MPPA

N-alpha-(9-Fluorenylmethyloxycarbonyl)-L-glutamic-acid-gamma-*t*-butyl ester-3-(4-oxymethylphenoxy)propionic acid

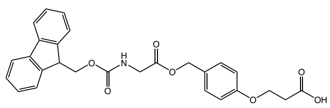
CAS-No.	864876-95-9
Formula	$C_{34}H_{37}NO_9$
Mol. weight	603,67 g/mol



LW00802 Fmoc-Gly-MPPA

N-alpha-(9-Fluorenylmethyloxycarbonyl)-glycine-3-(4-oxymethylphenoxy)propionic acid

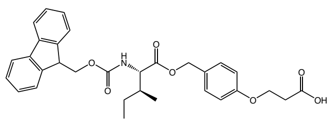
CAS-No.	130914-04-4
Formula	$C_{27}H_{25}NO_7$
Mol. weight	475,50 g/mol



LW01002 Fmoc-L-Ile-MPPA

N-alpha-(9-Fluorenylmethyloxycarbonyl)-L-isoleucine-3-(4-oxymethylphenoxy)propionic acid

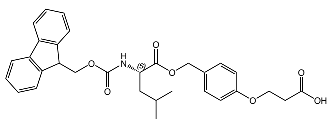
CAS-No.	864876-91-5
Formula	$C_{31}H_{33}NO_7$
Mol. weight	531,61 g/mol



LW01102 Fmoc-L-Leu-MPPA

N-alpha-(9-Fluorenylmethyloxycarbonyl)-L-leucine-3-(4-oxymethylphenoxy)propionic acid

CAS-No.	864876-90-4
Formula	$C_{31}H_{33}NO_7$
Mol. weight	531,61 g/mol



Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

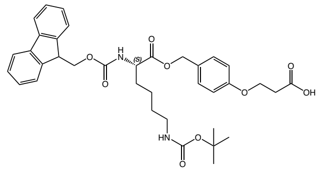
↑ back to content

Product details

LW01202 Fmoc-L-Lys(Boc)-MPPA

N-alpha-(9-Fluorenylmethyloxycarbonyl)-N-epsilon-*t*-butyloxycarbonyl-L-lysine-3-(4-oxymethylphenoxy)propionic acid

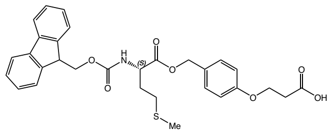
CAS-No.	1356004-85-7
Formula	$C_{36}H_{42}N_2O_9$
Mol. weight	646,74 g/mol



LW01302 Fmoc-L-Met-MPPA

N-alpha-(9-Fluorenylmethyloxycarbonyl)-L-methionine-3-(4-oxymethylphenoxy)propionic acid

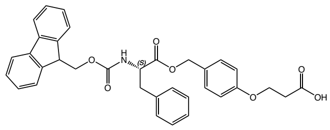
CAS-No.	864876-93-7
Formula	$C_{30}H_{31}NO_7S$
Mol. weight	549,64 g/mol



LW01402 Fmoc-L-Phe-MPPA

N-alpha-(9-Fluorenylmethyloxycarbonyl)-L-phenylalanine-3-(4-oxymethylphenoxy)propionic acid

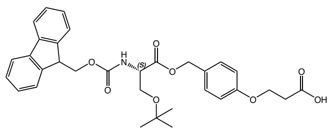
CAS-No.	864876-92-6
Formula	$C_{34}H_{31}NO_7$
Mol. weight	565,62 g/mol



LW01602 Fmoc-L-Ser(*t*Bu)-MPPA

N-alpha-(9-Fluorenylmethyloxycarbonyl)-O-*t*-butyl-L-serine-3-(4-oxymethylphenoxy)propionic acid

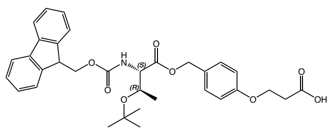
CAS-No.	864876-96-0
Formula	$C_{32}H_{35}NO_8$
Mol. weight	561,63 g/mol



LW01702 Fmoc-L-Thr(*t*Bu)-MPPA

N-alpha-(9-Fluorenylmethyloxycarbonyl)-O-*t*-butyl-L-threonine-3-(4-oxymethylphenoxy)propionic acid

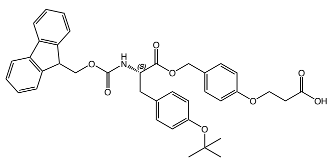
CAS-No.	864876-97-1
Formula	$C_{33}H_{37}NO_8$
Mol. weight	575,66 g/mol



LW01902 Fmoc-L-Tyr(*t*Bu)-MPPA

N-alpha-(9-Fluorenylmethyloxycarbonyl)-O-*t*-butyl-L-tyrosine-3-(4-oxymethylphenoxy)propionic acid

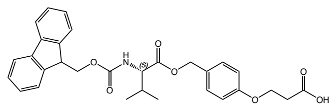
CAS-No.	864876-98-2
Formula	$C_{38}H_{39}NO_8$
Mol. weight	637,73 g/mol



Product details

LW02002 Fmoc-L-Val-MPPA

N-alpha-(9-Fluorenylmethyloxycarbonyl)-L-valine-3-(4-oxymethylphenoxy)propionic acid



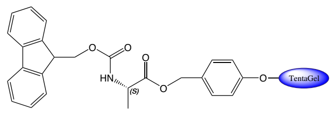
CAS-No.	864876-78-8
Formula	$C_{30}H_{31}NO_7$
Mol. weight	517,58 g/mol

9.2.8. Preloaded Wang-TentaGel® Resins

Product details

SAL1301 Fmoc-L-Ala-Wang TG

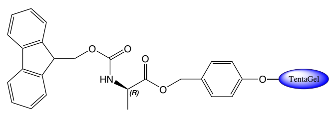
Fmoc-L-Ala-Wang TentaGel S



Mesh Size	90 µm
Loading	0.16-0.26 mmol/g

SAD1301 Fmoc-D-Ala-Wang TG

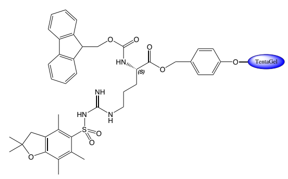
Fmoc-D-Ala-Wang TentaGel S



Mesh Size	90 µm
Loading	0.16-0.26 mmol/g

SAL1302 Fmoc-L-Arg(Pbf)-Wang TG

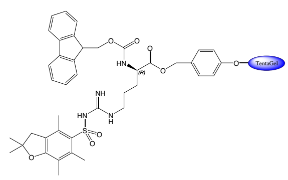
Fmoc-L-Arg(Pbf)-Wang TentaGel S



Mesh Size	90 µm
Loading	0.16-0.26 mmol/g

SAD1302 Fmoc-D-Arg(Pbf)-Wang TG

Fmoc-D-Arg(Pbf)-Wang TentaGel S



Mesh Size	90 µm
Loading	0.16-0.26 mmol/g

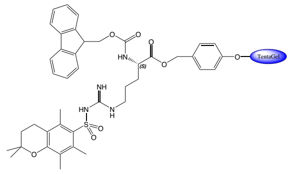
back to content

Product details

SAL1303 Fmoc-L-Arg(Pmc)-Wang TG

Fmoc-L-Arg(Pmc)-Wang TentaGel S

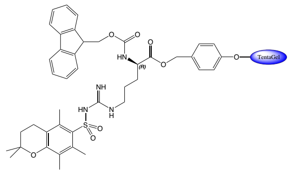
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAD1303 Fmoc-D-Arg(Pmc)-Wang TG

Fmoc-D-Arg(Pmc)-Wang TentaGel S

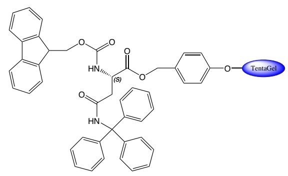
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAL1304 Fmoc-L-Asn(Trt)-Wang TG

Fmoc-L-Asn(Trt)-Wang TentaGel S

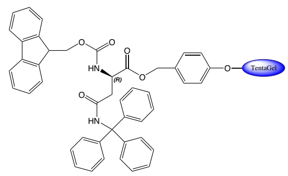
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAD1304 Fmoc-D-Asn(Trt)-Wang TG

Fmoc-D-Asn(Trt)-Wang TentaGel S

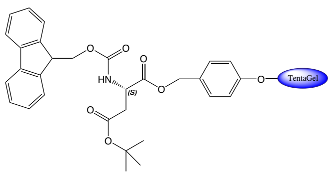
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAL1305 Fmoc-L-Asp(O*t*Bu)-Wang TG

Fmoc-L-Asp(OtBu)-Wang TentaGel S

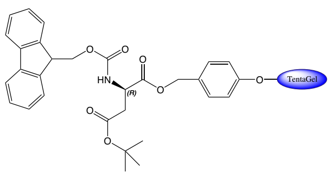
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAD1305 Fmoc-D-Asp(O*t*Bu)-Wang TG

Fmoc-D-Asp(OtBu)-Wang TentaGel S

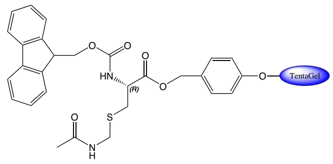
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAL1307 Fmoc-L-Cys(Acm)-Wang TG

Fmoc-L-Cys(S-Acm)-Wang TentaGel S

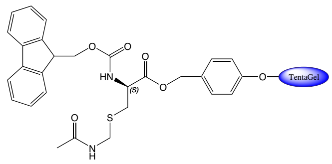
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1307 Fmoc-D-Cys(Acm)-Wang TG

Fmoc-D-Cys(S-Acm)-Wang TentaGel S

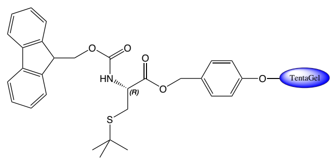
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1308 Fmoc-L-Cys(S-*t*Bu)-Wang TG

Fmoc-L-Cys(S-*t*Bu)-Wang TentaGel S

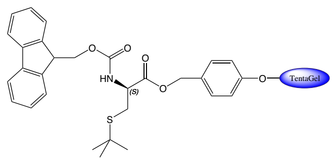
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1308 Fmoc-D-Cys(S-*t*Bu)-Wang TG

Fmoc-D-Cys(S-*t*Bu)-Wang TentaGel S

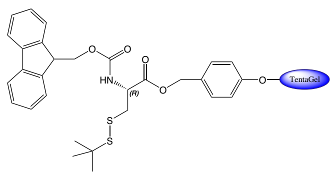
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1309 Fmoc-L-Cys(SS-*t*Bu)-Wang TG

Fmoc-L-Cys(S-S-*t*Bu)-Wang TentaGel S

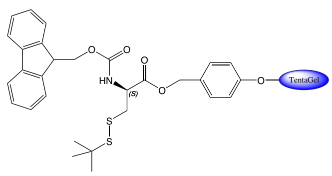
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1309 Fmoc-D-Cys(SS-*t*Bu)-Wang TG

Fmoc-D-Cys(S-S-*t*Bu)-Wang TentaGel S

Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



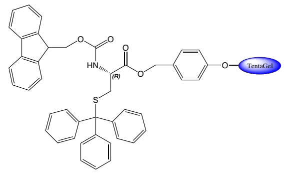
↑ back to content

Product details

SAL1306 Fmoc-L-Cys(Trt)-Wang TG

Fmoc-L-Cys(Trt)-Wang TentaGel S

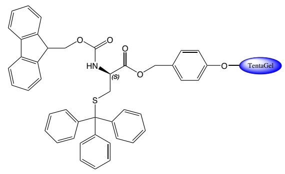
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1306 Fmoc-D-Cys(Trt)-Wang TG

Fmoc-D-Cys(Trt)-Wang TentaGel S

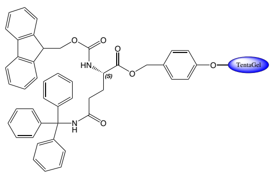
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1310 Fmoc-L-Gln(Trt)-Wang TG

Fmoc-L-Gln(Trt)-Wang TentaGel S

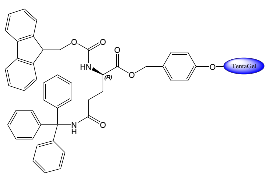
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1310 Fmoc-D-Gln(Trt)-Wang TG

Fmoc-D-Gln(Trt)-Wang TentaGel S

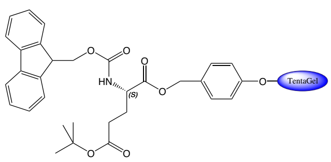
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1312 Fmoc-L-Glu(O*t*Bu)-Wang TG

Fmoc-L-Glu(O*t*Bu)-Wang TentaGel S

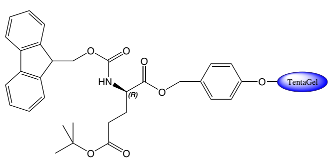
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1312 Fmoc-D-Glu(O*t*Bu)-Wang TG

Fmoc-D-Glu(O*t*Bu)-Wang TentaGel S

Mesh Size	90 µm
Loading	0.16-0.26 mmol/g

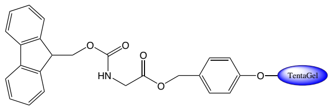


Product details

SAL1313 Fmoc-Gly-Wang TG

Fmoc-Gly-Wang TentaGel S

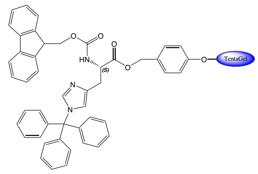
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAL1314 Fmoc-L-His(Trt)-Wang TG

Fmoc-L-His(Trt)-Wang TentaGel S

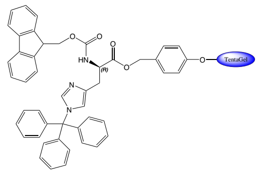
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAD1314 Fmoc-D-His(Trt)-Wang TG

Fmoc-D-His(Trt)-Wang TentaGel S

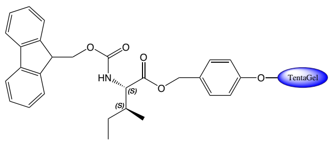
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAL1315 Fmoc-L-Ile-Wang TG

Fmoc-L-Ile-Wang TentaGel S

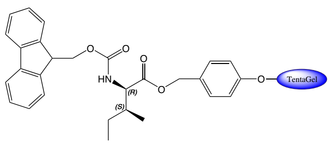
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAD1315 Fmoc-D-Ile-Wang TG

Fmoc-D-Ile-Wang TentaGel S

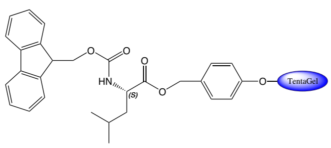
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAL1316 Fmoc-L-Leu-Wang TG

Fmoc-L-Leu-Wang TentaGel S

Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



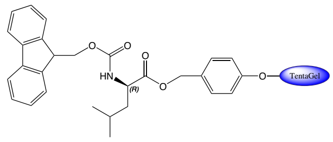
↑ back to content

Product details

SAD1316 Fmoc-D-Leu-Wang TG

Fmoc-D-Leu-Wang TentaGel S

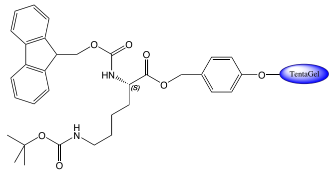
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAL1317 Fmoc-L-Lys(Boc)-Wang TG

Fmoc-L-Lys(Boc)-Wang TentaGel S

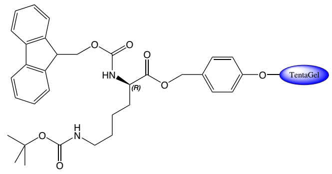
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAD1317 Fmoc-D-Lys(Boc)-Wang TG

Fmoc-D-Lys(Boc)-Wang TentaGel S

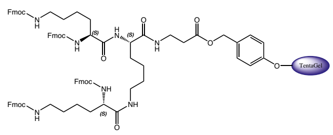
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAL2013 (Fmoc)4-Lys2-Lys-beta-Ala-Wang TG

(Fmoc)4-Lys2-Lys-beta-Ala-Wang TentaGel

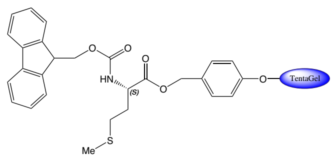
Loading 0.3-0.7 mmol/g



SAL1318 Fmoc-L-Met-Wang TG

Fmoc-L-Met-Wang TentaGel S

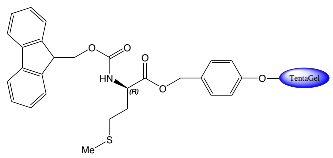
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAD1318 Fmoc-D-Met-Wang TG

Fmoc-D-Met-Wang TentaGel S

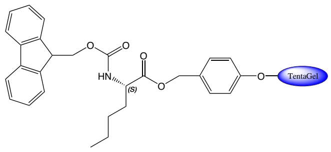
Mesh Size 90 µm
Loading 0.16-0.26 mmol/g



SAL1319 Fmoc-L-Nle-Wang TG

Fmoc-L-Nle-Wang TentaGel S

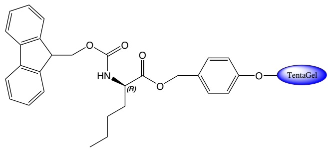
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1319 Fmoc-D-Nle-Wang TG

Fmoc-D-Nle-Wang TentaGel S

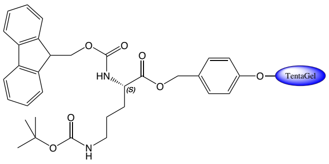
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1320 Fmoc-L-Orn(Boc)-Wang TG

Fmoc-L-Orn(Boc)-Wang TentaGel S

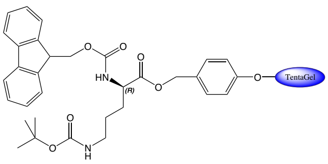
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1320 Fmoc-D-Orn(Boc)-Wang TG

Fmoc-D-Orn(Boc)-Wang TentaGel S

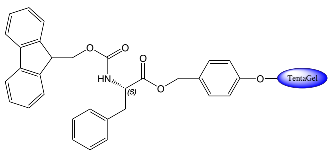
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1321 Fmoc-L-Phe-Wang TG

Fmoc-L-Phe-Wang TentaGel S

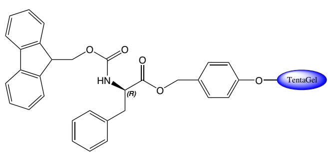
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1321 Fmoc-D-Phe-Wang TG

Fmoc-D-Phe-Wang TentaGel S

Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



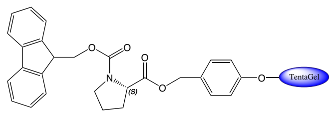
↑ back to content

Product details

SAL1322 Fmoc-L-Pro-Wang TG

Fmoc-L-Pro-Wang TentaGel S

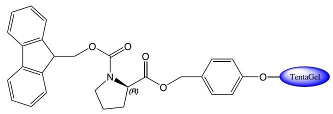
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1322 Fmoc-D-Pro-Wang TG

Fmoc-D-Pro-Wang TentaGel S

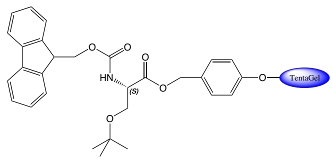
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1323 Fmoc-L-Ser(*t*Bu)-Wang TG

Fmoc-L-Ser(*t*Bu)-Wang TentaGel S

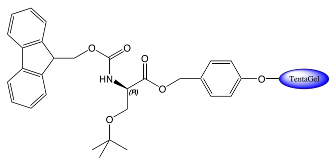
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1323 Fmoc-D-Ser(*t*Bu)-Wang TG

Fmoc-D-Ser(*t*Bu)-Wang TentaGel S

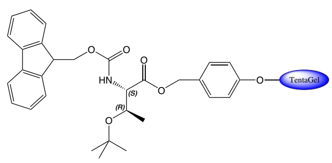
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1324 Fmoc-L-Thr(*t*Bu)-Wang TG

Fmoc-L-Thr(*t*Bu)-Wang TentaGel S

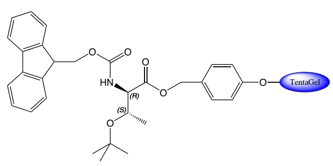
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1324 Fmoc-D-Thr(*t*Bu)-Wang TG

Fmoc-D-Thr(*t*Bu)-Wang TentaGel S

Mesh Size	90 µm
Loading	0.16-0.26 mmol/g

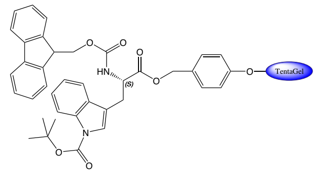


Product details

SAL1328 Fmoc-L-Trp(Boc)-Wang TG

Fmoc-L-Trp(Boc)-Wang TentaGel S

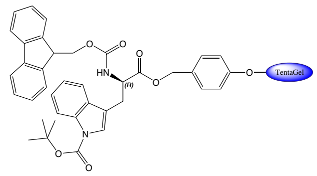
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1328 Fmoc-D-Trp(Boc)-Wang TG

Fmoc-D-Trp(Boc)-Wang TentaGel S

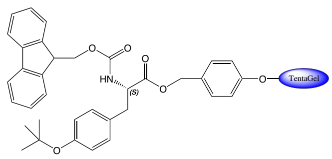
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1326 Fmoc-L-Tyr(*t*Bu)-Wang TG

Fmoc-L-Tyr(*t*Bu)-Wang TentaGel S

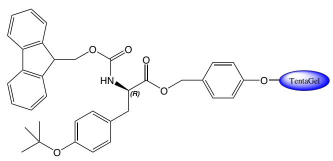
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1326 Fmoc-D-Tyr(*t*Bu)-Wang TG

Fmoc-D-Tyr(*t*Bu)-Wang TentaGel S

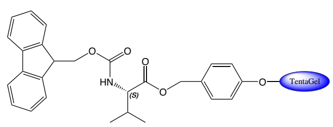
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAL1327 Fmoc-L-Val-Wang TG

Fmoc-L-Val-Wang TentaGel S

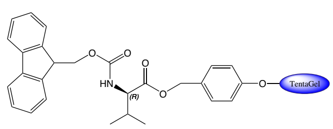
Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



SAD1327 Fmoc-D-Val-Wang TG

Fmoc-D-Val-Wang TentaGel S

Mesh Size	90 µm
Loading	0.16-0.26 mmol/g



↑ back to content

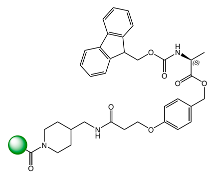
9.2.9. Preloaded Wang-Type Li Resins

Product details

BR-5282 Fmoc-L-Ala-MPPA-Li Resin

Fluorenylmethoxycarbonyl-L-alanine-oxymethylphen-oxy propionic acid-Li Resin

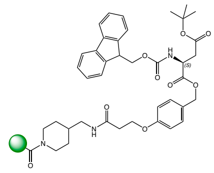
Mesh Size 45-55 mesh
Loading 0,4-0,6 mmol/g



BR-5283 Fmoc-L-Asp(O*t*Bu)-MPPA-Li Resin

Fluorenylmethoxycarbonyl-L-aspartate(O*t*Bu)-oxy-methylphenoxy propionic acid-Li Resin

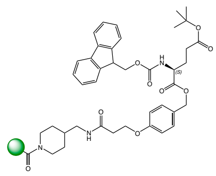
Mesh Size 45-55 mesh
Loading 0,4-0,6 mmol/g



BR-5284 Fmoc-L-Glu(O*t*Bu)-MPPA-Li Resin

Fluorenylmethoxycarbonyl-L-glutamate(O*t*Bu)-oxy-methylphenoxy propionic acid-Li Resin

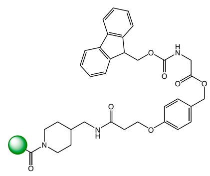
Mesh Size 45-55 mesh
Loading 0,4-0,6 mmol/g



BR-5285 Fmoc-Gly-MPPA-Li Resin

Fluorenylmethoxycarbonyl-glycine-oxymethylphenoxy propionic acid-Li Resin

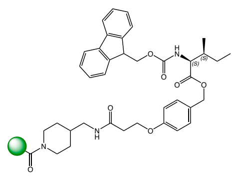
Mesh Size 45-55 mesh
Loading 0,4-0,6 mmol/g



BR-5286 Fmoc-L-Ile-MPPA-Li Resin

Fluorenylmethoxycarbonyl-L-isoleucine-oxymethyl-phenoxy propionic acid-Li Resin

Mesh Size 45-55 mesh
Loading 0,4-0,6 mmol/g

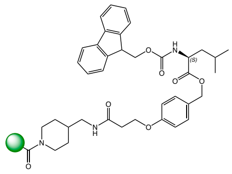


Product details

BR-5287 Fmoc-L-Leu-MPPA-Li Resin

Fluorenylmethoxycarbonyl-L-leucine-oxymethylphen-oxy propionic acid-Li Resin

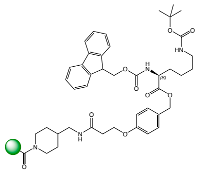
Mesh Size	45-55 mesh
Loading	0,4-0,6 mmol/g



BR-5288 Fmoc-L-Lys(Boc)-MPPA-Li Resin

Fluorenylmethoxycarbonyl-L-lysine(Boc)-oxymethyl-phenoxy propionic acid-Li Resin

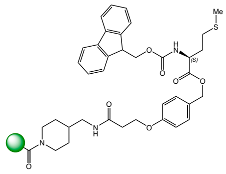
Mesh Size	45-55 mesh
Loading	0,4-0,6 mmol/g



BR-5289 Fmoc-L-Met-MPPA-Li Resin

Fluorenylmethoxycarbonyl-L-methionine-oxymethyl-phenoxy propionic acid-Li Resin

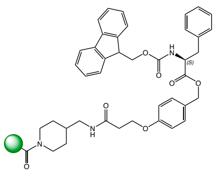
Mesh Size	45-55 mesh
Loading	0,4-0,6 mmol/g



BR-5290 Fmoc-L-Phe-MPPA-Li Resin

Fluorenylmethoxycarbonyl-L-phenylalanine-oxy-methylphenoxy propionic acid-Li Resin

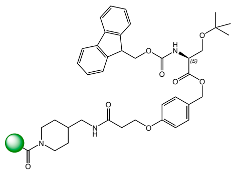
Mesh Size	45-55 mesh
Loading	0,4-0,6 mmol/g



BR-5291 Fmoc-L-Ser(*t*Bu)-MPPA-Li Resin

Fluorenylmethoxycarbonyl-L-serine(*t*Bu)-oxymethyl-phenoxy propionic acid-Li Resin

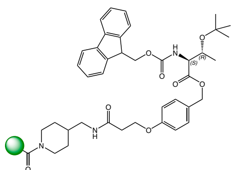
Mesh Size	45-55 mesh
Loading	0,4-0,6 mmol/g



BR-5292 Fmoc-L-Thr(*t*Bu)-MPPA-Li Resin

Fluorenylmethoxycarbonyl-L-threonine(*t*Bu)-oxy-methylphenoxy propionic acid-Li Resin

Mesh Size	45-55 mesh
Loading	0,4-0,6 mmol/g



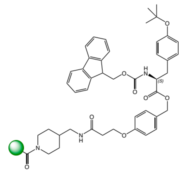
↑ back to content

Product details

BR-5293 Fmoc-L-Tyr(*t*Bu)-MPPA-Li Resin

Fluorenylmethoxycarbonyl-L-tyrosine(*t*Bu)-oxymethyl-phenoxy propionic acid-Li Resin

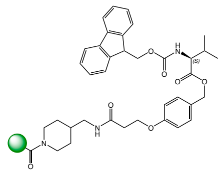
Mesh Size	45-55 mesh
Loading	0,4-0,6 mmol/g



BR-5294 Fmoc-L-Val-MPPA-Li Resin

Fluorenylmethoxycarbonyl-L-valine-oxymethylphenoxy propionic acid-Li Resin

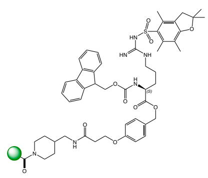
Mesh Size	45-55 mesh
Loading	0,4-0,6 mmol/g



BR-5295 Fmoc-L-Arg(Pbf)-MPPA-Li Resin

Fluorenylmethoxycarbonyl-L-arginine(Pbf)-oxymethyl-phenoxy propionic acid-Li Resin

Mesh Size	45-55 mesh
Loading	0,4-0,6 mmol/g



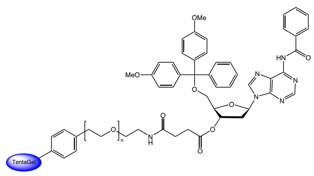
9.2.10. Preloaded Resins for the Synthesis of Oligonucleotides

Product details

N300021 dA TG (90µm)

5'-Dimethoxytrityl-N-benzoyl-2'-deoxyadenosi-ne-3'-succinyl TentaGel N

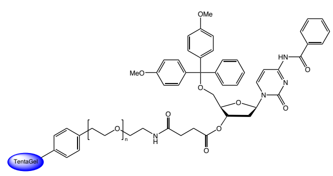
Mesh Size	90 µm
Loading	150 - 220 µmol/g



N300022 dC TG (90µm)

5'-Dimethoxytrityl-N-benzoyl-2'-deoxycytidine-3'-suc-cinyl TentaGel N

Mesh Size	90 µm
Loading	150 - 220 µmol/g

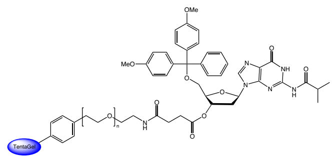


Product details

N300023 dG TG (90µm)

5'-Dimethoxytrityl-N-isobutyryl-2'-deoxyguanosine-3'-succinyl TentaGel N

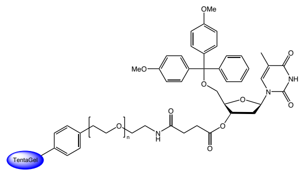
Mesh Size	90 µm
Loading	150 - 220 µmol/g



N300024 dT TG (90µm)

5'-Dimethoxytrityl-2'-deoxythymidine-3'-succinyl TentaGel N

Mesh Size	90 µm
Loading	150 - 220 µmol/g



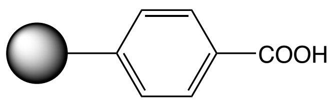
9.3. Scavenger Resins

Product details

SR-1130 Polystyrene-COOH

Benzoic acid polystyrene (rigid, macroporous)

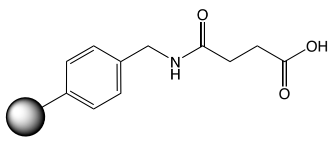
CAS-No.	120246-33-5
Mesh Size	200-400µm
Loading	0.5-2.5 mmol/g



BR-5258 Polystyrene-AM-COOH

Aminomethyl-succinamic acid polystyrene

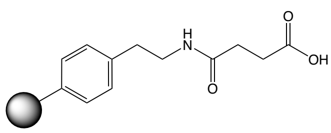
Mesh Size	400-450 µm
Loading	0.6-1.5 mmol/g
DVB	1% DVB



BR-5253 Polystyrene-AE-COOH

Aminoethyl-succinamic acid polystyrene

Mesh Size	400-450 µm
Loading	0.6-1.2 mmol/g
DVB	1% DVB



Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

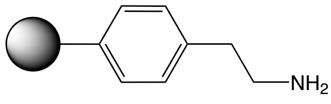
↑ back to content

	Product details

BR-5267 Polystyrene-Et-NH_2

Aminoethyl polystyrene

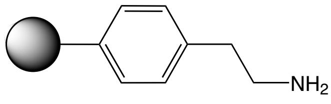
Mesh Size	160-200 µm
Loading	0.6-1.4 mmol/g
DVB	1% DVB



BR-5269 Polystyrene-Et-NH_2

Aminoethyl polystyrene

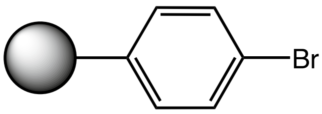
Mesh Size	400-450 µm
Loading	0.6-1.4 mmol/g
DVB	1% DVB



BR-5081 Polystyrene-Br

Bromo polystyrene

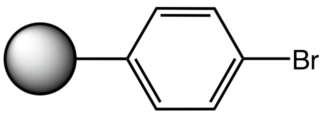
Mesh Size	100-200 mesh
Loading	2-4 mmol/g
DVB	1% DVB



BR-5110 Polystyrene-Br

Bromo polystyrene

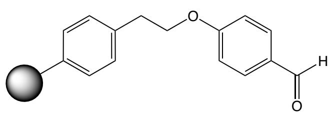
Mesh Size	200-400 mesh
Loading	2-4 mmol/g
DVB	1% DVB



SR-1129 Polystyrene-benzaldehyde

4-(Phenethyloxy)benzaldehyde polystyrene (rigid, macroporous)

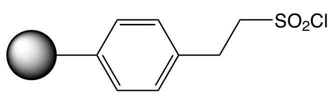
CAS-No.	55279-75-9
Mesh Size	200-400 µm
Loading	0.5-1.5 mmol/g



SR-1073 Polystyrene-Et-SO_2Cl

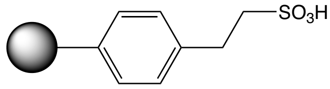
Polystyrene ethyl sulfonyl chloride

Mesh Size	100-200 mesh
Loading	0.4-2.0 mmol/g
DVB	1% DVB



SR-1120 Polystyrene-Et-SO_3H

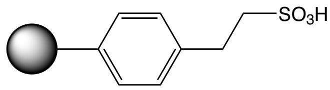
Polystyrene ethyl sulfonic acid



Mesh Size	100-200 mesh
Loading	0.4-2.0 mmol/g
DVB	1% DVB

SR-1121 Polystyrene-Et-SO_3H

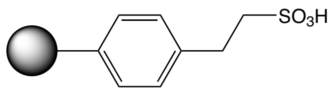
Polystyrene ethyl sulfonic acid



Mesh Size	200-400 mesh
Loading	0.4-2.0 mmol/g
DVB	1% DVB

SR-1122 Polystyrene-Et-SO_3H

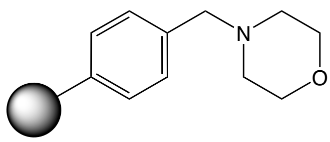
Polystyrene ethyl sulfonic acid



Mesh Size	400-450µm
Loading	0.4-2.0 mmol/g
DVB	1% DVB

SR-1123 Polystyrene-Morpholine

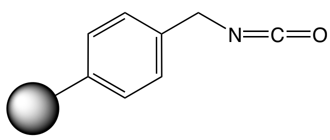
Morpholinomethyl polystyrene (rigid, macroporous)



CAS-No.	138048-80-3
Mesh Size	200-400 µm
Loading	0.4-1.0 mmol/g

SR-1124 Polystyrene-NCO

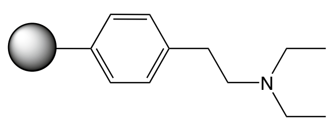
Isocyanatomethyl polystyrene (rigid, macroporous)



CAS-No.	59990-69-1
Mesh Size	200-400µm
Loading	0.5-1.5 mmol/g

SR-1093 Polystyrene-NEt_2

Diethylaminoethyl polystyrene (rigid, macroporous)



Mesh Size	200-400 µm
Loading	0.5-1.5 mmol/g

Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

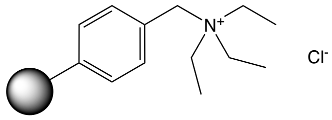
↑ back to content

Product details

SR-1131 Polystyrene-NEt_3Cl

N,N,N-Triethyl-aminomethyl polystyrene chloride (rigid, macroporous)

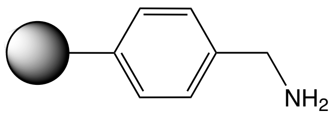
Mesh Size	200-400 µm
Loading	0.5-1.5 mmol/g



SR-1132 Polystyrene-NH_2

Aminomethyl polystyrene (rigid, macroporous)

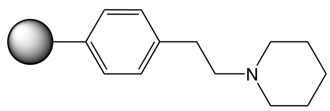
CAS-No.	89551-24-6
Mesh Size	200-400 µm
Loading	0.5-4.0 mmol/g



SR-1133 Polystyrene-Pip

Piperidinoethyl polystyrene (rigid, macroporous)

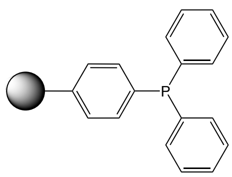
Mesh Size	200-400 µm
Loading	0.4-1.0 mmol/g



SR-1032 Polystyrene-PPh2

Triphenylphosphine on polystyrene

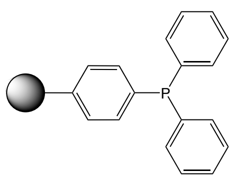
CAS-No.	39319-11-4
Mesh Size	100-200 mesh
Loading	0.8-1.6 mmol/g
DVB	1% DVB



SR-1125 Polystyrene-PPh2

Triphenylphosphine on polystyrene

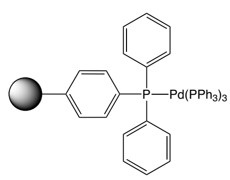
CAS-No.	39319-11-4
Mesh Size	200-400 mesh
Loading	1.0-1.5 mmol/g
DVB	1% DVB



SR-1134 Polystyrene-PPh_2-$Pd(PPh_3)_3$

Tris(triphenylphosphin)-palladium(0)-triphenylphos-phine polystyrene

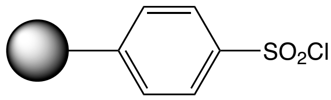
Mesh Size	100-200 mesh
Loading	0.1-0.15 mmol/g
DVB	1% DVB



SR-1034 Polystyrene-SO2Cl

Sulfonylchloride polystyrene

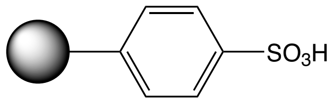
CAS-No.	163894-16-4
Mesh Size	100-200 mesh
Loading	0.4-4.0 mmol/g
DVB	1% DVB



SR-1126 Polystyrene-SO_3H

Polystyrene sulfonic acid (rigid, macroporous)

CAS-No.	28210-41-5
Mesh Size	200-400 µm
Loading	1.0-3.5 mmol/g



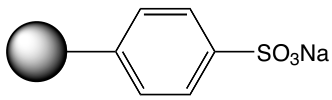
Sulfonic Acid Resin, polystyrene resin functionalized with a *p*-toluenesulfonic acid end group. It is a strong cation exchange resin and is capable of scavenging heterocyclic bases in addition to primary, secondary and tertiary amines. MP-TsOH can also be utilized in many acid catalyzed reactions such as acetal and ketal formation. It is an excellent choice for the 'catch and release' purification of amines resulting from a variety of reactions including reductive aminations. This resin is also quite effective in solid-phase extraction (SPE) of amine bases in sample preparation of bio-analytes such as blood, urine, etc.

Product details

SR-1127 Polystyrene-SO3Na

Polystyrene sulfonic acid Na form (rigid, macroporous)

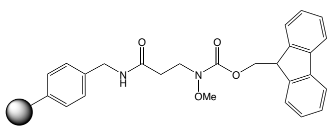
CAS-No.	25704-18-1
Mesh Size	200-400 µm
Loading	1.0-3.5 mmol/g



SR-1039 Weinreb Amide Resin

3-(N-Fmoc-N-methoxy)propyl-amidomethyl polysty-rene

Mesh Size	100-200 mesh
Loading	0.5-1.3 mmol/g
DVB	1% DVB



↑ back to content

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Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

↑ back to content

Index

↑ back to content

Resin Guideline

↑ back to content

Resin Guideline

Product code	Product name	Page
WAA11323	Fmoc-L-Ser(*t*Bu)-Wang Resin	145
WAA41323	Fmoc-L-Ser(*t*Bu)-Wang Resin	145
SAL1323	Fmoc-L-Ser(*t*Bu)-Wang TG	157
TCP1240	Fmoc-L-Ser(Trt)-TCP-Resin	109
RAA2680	Fmoc-L-Thr(MeO-BH resin)-NH_2	45
SAL1124	Fmoc-L-Thr(*t*Bu)-AC TG	127
LW01702	Fmoc-L-Thr(*t*Bu)-MPPA	149
BR-5292	Fmoc-L-Thr(*t*Bu)-MPPA-Li Resin	160
PYV1260	Fmoc-L-Thr(*t*Bu)-NHN=Pyv Resin	132
RAL1126	Fmoc-L-Thr(*t*Bu)-ol-2CT Resin	101
TCP1190	Fmoc-L-Thr(*t*Bu)-TCP-Resin	109
SAL1224	Fmoc-L-Thr(*t*Bu)-Trt TG	118
WAA11324	Fmoc-L-Thr(*t*Bu)-Wang Resin	145
WAA41324	Fmoc-L-Thr(*t*Bu)-Wang Resin	146
SAL1324	Fmoc-L-Thr(*t*Bu)-Wang TG	157
TCP1250	Fmoc-L-Thr(Trt)-TCP-Resin	109
WAA6220	Fmoc-L-Thr(Trt)-Wang Resin	146
RAA5941	Fmoc-L-Trp(Boc)-2CT Resin	103
SAL1128	Fmoc-L-Trp(Boc)-AC TG	127
PYV1270	Fmoc-L-Trp(Boc)-NHN=Pyv Resin	132
TCP1260	Fmoc-L-Trp(Boc)-TCP-Resin	110
SAL1228	Fmoc-L-Trp(Boc)-Trt TG	119
WAA11328	Fmoc-L-Trp(Boc)-Wang Resin	146
WAA41328	Fmoc-L-Trp(Boc)-Wang Resin	146
SAL1328	Fmoc-L-Trp(Boc)-Wang TG	158
TCP1070	Fmoc-L-Trp-TCP-Resin	110
RAA2690	Fmoc-L-Tyr(2CT resin)-NH_2	104
RAA5420	Fmoc-L-Tyr(*t*Bu)-2CT Resin	104
SAL1126	Fmoc-L-Tyr(*t*Bu)-AC TG	128
LW01902	Fmoc-L-Tyr(*t*Bu)-MPPA	149
BR-5293	Fmoc-L-Tyr(*t*Bu)-MPPA-Li Resin	161
PYV1280	Fmoc-L-Tyr(*t*Bu)-NHN=Pyv Resin	132
TCP1200	Fmoc-L-Tyr(*t*Bu)-TCP-Resin	110
SAL1226	Fmoc-L-Tyr(*t*Bu)-Trt TG	119
WAA11326	Fmoc-L-Tyr(*t*Bu)-Wang Resin	147
WAA41326	Fmoc-L-Tyr(*t*Bu)-Wang Resin	147
SAL1326	Fmoc-L-Tyr(*t*Bu)-Wang TG	158
RAA5915	Fmoc-L-Val-2-CT Resin	104
TCP1300	Fmoc-L-Val-[13C5,15N]-TCP-Resin	110
SAL1127	Fmoc-L-Val-AC TG	128
LW02002	Fmoc-L-Val-MPPA	150
BR-5294	Fmoc-L-Val-MPPA-Li Resin	161
PYV1290	Fmoc-L-Val-NHN=Pyv Resin	132
TCP1080	Fmoc-L-Val-TCP-Resin	110
SAL1227	Fmoc-L-Val-Trt TG	119
WAA41327	Fmoc-L-Val-Wang Resin	147
WAA11327	Fmoc-L-Val-Wang Resin	147
SAL1327	Fmoc-L-Val-Wang TG	158
H-10091	Fmoc-MeDbz-RAM Resin	57
S-30091	Fmoc-MeDbz-RAM TG S	56
RL-2260	Fmoc-NH-MsbH-COOH	80
RAL1155	Fmoc-NH-O-2CT Resin	72
PYV1000	Fmoc-NHN=Pyv Resin	129
BR-5279	Fmoc-NHNH-2CT Resin	132
BR-5280	Fmoc-NHNH-Trt-PEG Resin	132
PEG8260	Fmoc-NHNH-Trt-PEG Resin HL	133
PEG8265	Fmoc-NHNH-Trt-PEG Resin XV	133
BR-5209	Fmoc-PAL-MBHA Resin	58
BR-1330	Fmoc-Rink Amide AM resin	54
RL-1027	Fmoc-Rink Amide-Linker	54
BR-1300	Fmoc-Rink-Amid MBHA resin	55
BR-1340	Fmoc-Rink-Amide AM resin	55
BR-1320	Fmoc-Rink-Amide AM resin	54
BR-1360	Fmoc-Rink-Amide PEG AM Resin	55
BR-1315	Fmoc-Rink-Amide-2CT resin	55
BR-1310	Fmoc-Rink-Amide-2CT resin	55
BR-1305	Fmoc-Rink-Amide-MBHA resin	55
WAA5132	Fmoc-Sar-Wang Resin	140
BR-2000	Fmoc-Sieber-PS resin	58
BR-2001	Fmoc-Sieber-PS resin LL	58
BR-2005	Fmoc-Sieber-TG resin	58
RAA1004	H-D-Ala-2CT Resin	82
RAA1134	H-D-allo-Ile-2CT Resin	93
RAA1029	H-D-Arg(Pbf)-2CT Resin	83
RAA1043	H-D-Asn-2CT Resin	84
RAA1049	H-D-Asp(O*t*Bu)-2CT Resin	85
RAA1060	H-D-Cys(Trt)-2CT Resin	87
RAA1074	H-D-Glu(O*t*Bu)-2CT Resin	88
RAA1100	H-D-His(Trt)-2CT Resin	91
RAA1120	H-D-Hse(Trt)-2CT Resin	92
RAA1144	H-D-Leu-2CT Resin	93
RAA1154	H-D-Lys(Boc)-2CT Resin	94

↑ back to content

Resin Guideline

↑ back to content

Resin Guideline

Notes

Introduction: The Origins and Background of SP(P)S
Physical Properties of Resins
Base Resins
Resins and Linkers for the Synthesis of Peptide Acids
Resins and Linkers for the Synthesis of Peptide Amides
Hydrazone Resins
Scavenger Resins
Standard Protocols for Peptide Synthesis
Product Catalogue
Index

↑ back to content

Code of Conduct

As business activity of Iris Biotech GmbH impacts people's lives and health, it must be operated in ethical and correct manner and act with integrity and responsibility. To ensure high ethical standards and fair business practices, Iris Biotech GmbH applies an integrated policy known as its Code of Conduct.

In 2001 Iris Biotech GmbH was founded just at the beginning of the Biotech movement and the first remarkable breakthrough of biotech pharma products. Although the biotech field is rather young compared to other industries we believe on long-term business, a good partnership between our business partners and Iris Biotech GmbH and a good reputation. It is our duty as well as our responsibility to maintain and to extend this over the next generations – based on the principles of an honourable and prudent tradesman which based upon the concept of honourable entrepreneurship.

This Code of Conduct has been developed following the "Voluntary Guidelines for Manufacturers of Fine Chemical Intermediates and Active Ingredients" issued by AIME (Agrochemical & Intermediates Manufacturers in Europe) and the requirements of some of our business associates.

Iris Biotech GmbH commits to hold this Code of Conduct and to include and apply its principles in the management system and the company policies.

Ethics

Iris Biotech GmbH undertakes business in an ethical manner and acts with integrity. All corruption, extortion and embezzlement are prohibited. We do not pay or accept bribes or participate in other illegal inducements in business or government relationships. We conduct our business in compliance with all applicable anti-trust laws. Employees are encouraged to report concerns or illegal activities in the workplace, without threat of reprisal, intimidation or harassment.

Labour

Iris Biotech GmbH is committed to uphold the human rights of workers and to treat them with dignity and respect. Child labour, workplace harassment, discrimination, and harsh and inhumane treatment are prohibited. Iris Biotech GmbH respects the rights of the employees to associate freely, join or not join labour unions, seek representation and join workers' councils. Employees are paid and their working timetable is established according to applicable wage and labour laws. Employees are able to communicate openly with management regarding working conditions without threat of reprisal, intimidation or harassment.

General Policies

Contracts and Secrecy Agreements are binding and the confidential information received is only used for intended purposes. Clear management and organizational structures exist to provide efficient normal working and to address problems quickly. Know-how is protected and intellectual property isrespected.

Health and Safety

Iris Biotech GmbH provides a safe and healthy working environment to the employees and protects them from overexposure to chemical and physical hazards. Products are produced, stored and shipped under the guidelines of the relevant chemical and safety legislation. Risks and emergency scenarios are identified and evaluated, and their possible impact is minimized by implementing emergency plans and written procedures. Safety information regarding hazardous materials is available to educate, train and protect workers from hazards. Preventive equipment and facilities maintenance is performed at suitable periods to reduce potential hazards. Employees are regularly trained in health and safety matters and are informed about product properties and risk classification when it is required.

Environment

Iris Biotech GmbH operates in an environmentally responsible and efficient manner, minimizing adverse impacts on the environment. Waste streams are managed to ensure a safe handling, movement, storage, recycling and reuse, before and after being generated. Systems to prevent and mitigate accidental spills and releases to the environment are in place. All required environmental permits and licenses are obtained and their operational and reporting requirements are complied with.

Production and Quality Management

A quality management system following the Good Distribution Practices (GDP rules) of Active Pharmaceutical Ingredients is established covering all the aspects of the worldwide distribution of products. Regular audits are performed to evaluate the efficiency and fulfilling of the quality system. Process controls to provide reproducible product quality are established. There are preventive maintenance procedures to ensure plant reliability and the lowest risk of failure. Staff is trained periodically about GMP and GDP rules. Procedures are established and installations are designed to avoid cross contamination. Batch and analytical records are kept for inspection and audit purposes for suitable periods according guidelines.

Research and Development

Research and development staff education is appropriate to their functional activity and they are trained to develop, optimize and scale-up the processes. Intellectual property is respected and know-how protected. Development of manufacturing processes reflects the principles of the Green Chemistry according to the American Chemical Society Green Chemistry Institute. Animal testing is not used unless alternatives are not scientifically valid or accepted by regulators. If animal testing is carried out, animals are treated so that pain and stress are minimized.

Terms and Conditions of Sales

All orders placed by a buyer are accepted and all contracts are made subject to the terms which shall prevail and be effective notwithstanding any variations or additions contained in any order or other document submitted by the buyer. No modification of these terms shall be binding upon Iris Biotech GmbH unless made in writing by an authorised representative of Iris Biotech GmbH.

Placing of Orders

Every order made by the buyer shall be deemed an offer by the buyer to purchase products from Iris Biotech GmbH and will not be binding on Iris Biotech GmbH until a duly authorised representative of Iris Biotech GmbH has accepted the offer made by the buyer. Iris Biotech GmbH may accept orders from commercial, educational or government organisations, but not from private individuals and Iris Biotech GmbH reserves the right to insist on a written order and/or references from the buyer before proceeding.

There is no minimum order value. At the time of acceptance of an order Iris Biotech GmbH will either arrange prompt despatch from stock or the manufacture/acquisition of material to satisfy the order. In the event of the latter Iris Biotech GmbH will indicate an estimated delivery date. In addition to all its other rights Iris Biotech GmbH reserves the right to refuse the subsequent cancellation of the order if Iris Biotech GmbH expects to deliver theproduct on or prior to the estimated delivery date. Time shall not be of the essence in respect of delivery of the products. If Iris Biotech GmbH is unable to deliver any products by reason of any circumstances beyond its reasonable control („Force Majeure“) then the period for delivery shall be extended by the time lost due to such Force Majeure. Details of Force Majeure will be forwarded by Iris Biotech GmbH to the buyer as soon as reasonably practicable.

Prices, Quotations and Payments

Prices are subject to change. For the avoidance of doubt, the price advised by Iris Biotech GmbH at the time of the buyer placing the order shall supersede any previous price indications. The buyer must contact the local office of Iris Biotech GmbH before ordering if further information is required. Unless otherwise agreed by the buyer and Iris Biotech GmbH, the price shall be for delivery ex-works. In the event that the buyer requires delivery of the products otherwise than ex-works the buyer should contact the local office of Iris Biotech GmbH in order to detail its requirements. Iris Biotech GmbH shall, at its discretion, arrange the buyer‘s delivery requirements including, without limitation, transit insurance, the mode of transit (Iris Biotech GmbH reserves the right to vary the mode of transit if any regulations or other relevant considerations so require) and any special packaging requirements (including cylinders). For the avoidance of doubt all costs of delivery and packaging in accordance with the buyer‘s requests over and above that of delivery in standard packaging ex-works shall be for the buyer‘s account unless otherwise agreed by both parties. Incoterms 2020 shall apply. Any tax, duty or charge imposed by governmental authority or otherwise and any other applicable taxes, duties or charges shall be for the buyer‘s account. Iris Biotech GmbH may, on request and where possible, provide quotations for multiple packs or bulk quantities, and non-listed items. Irrespective of the type of request or means of response all quotations must be accepted by the buyer without condition and in writing before an order will be accepted by Iris Biotech GmbH. Unless agreed in writing on different terms, quotations are valid for 30 days from the date thereof. Payment terms are net 30 days from invoice date unless otherwise agreed in writing. Iris Biotech GmbH reserves the right to request advance payment at its discretion. For overseas transactions the buyer shall pay all the banking charges of Iris Biotech GmbH. The buyer shall not be entitled to withhold or set-off payment for the products for any reason whatsoever. Government/ Corporate Visa and MasterCard (and other such credit cards) may be accepted on approved accounts for payment of the products. Personal credit cards are not acceptable. Failure to comply with the terms of payment of Iris Biotech GmbH shall constitute default without reminder. In these circumstances Iris Biotech GmbH may (without prejudice to any other of its rights under these terms) charge interest to accrue on a daily basis at the rate of 2% per month from the date upon which payment falls due to the actual date of payment (such interest shall be paid monthly). If the buyer shall fail to fulfil the payment terms in respect of any invoice of Iris Biotech GmbH Iris Biotech GmbH may demand payment of all outstanding balances from the buyer whether due or not and/or cancel all outstanding orders and/or decline to make further deliveries or provision of services except upon receipt of cash or satisfactory securities. Until payment by the buyer in full of the price and any other monies due to Iris Biotech GmbH in respect of all other products or services supplied or agreed to be supplied by Iris Biotech GmbH to the buyer (including but without limitation any costs of delivery) the property in the products shall remain vested in Iris Biotech GmbH.

Shipping, Packaging and Returns

The buyer shall inspect goods immediately on receipt and inform Iris Biotech GmbH of any shortage or damage within five days. Quality problems must be notified within ten days of receipt. Goods must not be returned without prior written authorisation of Iris Biotech GmbH. Iris Biotech GmbH shall at its sole discretion replace the defective products (or parts thereof) free of charge or refund the price (or proportionate price) to buyer. Opened or damaged containers cannot be returned by the buyer without the written prior agreement of Iris Biotech GmbH. In the case of agreed damaged containers which cannot be so returned, the buyer assumes responsibility for the safe disposal of such containers in accordance with all applicable laws.

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Products are analysed in the Quality Control laboratories of Iris Biotech GmbH's production partners by methods and procedures which Iris Biotech GmbH considers appropriate. In the event of any dispute concerning reported discrepancies arising from the buyer's analytical results, determined by the buyer's own analytical procedures, Iris Biotech GmbH reserves the right to rely on the results of own analytical methods of Iris Biotech GmbH. Certificates of Analysis or Certificates of Conformity are available at the discretion of Iris Biotech GmbH for bulk orders but not normally for prepack orders. Iris Biotech GmbH reserves the right to make a charge for such certification. Specifications may change and reasonable variation from any value listed should not form the basis of a dispute. Any supply by Iris Biotech GmbH of bespoke or custom product for a buyer shall be to a specification agreed by both parties in writing. Technical information, provided orally, in writing, or by electronic means by or on behalf of Iris Biotech GmbH, including any descriptions, references, illustrations or diagrams in any catalogue or brochure, is provided for guidance purposes only and is subject to change.

Safety

All chemicals should be handled only by competent, suitably trained persons, familiar with laboratory procedures and potential chemical hazards. The burden of safe use of the products of Iris Biotech GmbH vests in the buyer. The buyer assumes all responsibility for warning his employees, and any persons who might reasonably be expected to come into contact with the products, of all risks to person and property in any way connected with the products and for instructing them in their safe handling and use. The buyer also assumes the responsibility for the safe disposal of all products in accordance with all applicable laws.

Uses, Warranties and Liabilities

All products of Iris Biotech GmbH are intended for laboratory research purposes and unless otherwise stated on product labels, in the catalogue and product information sheet of Iris Biotech GmbH or in other literature furnished to the buyer, are not to be used for any other purposes, including but not limited to use as or as components in drugs for human or animal use, medical devices, cosmetics, food additives, household chemicals, agricultural or horticultural products or pesticides. Iris Biotech GmbH offers no warranty regarding the fitness of any product for a particular purpose and shall not be responsible for any loss or damage whatsoever arising there from. No warranty or representation is given by Iris Biotech GmbH that the products do not infringe any letters patent, trademarks, registered designs or other industrial rights. The buyer further warrants to Iris Biotech GmbH that any use of the products in the United States of America shall not result in the products becoming adulterated or misbranded within the meaning of the Federal Food, Drug and Cosmetic Act (or such equivalent legislation in force in the buyer's jurisdiction) and shall not be materials which may not, under sections 404, 505 or 512 of the Act, be introduced into interstate commerce. The buyer acknowledges that, since the products of Iris Biotech GmbH are intended for research purposes, they may not be on the Toxic Substances Control Act 1976 („TSCA") inventory. The buyer warrants that it shall ensure that the products are approved for use under the TSCA (or such other equivalent legislation in force in the buyer's jurisdiction), if applicable. The buyer shall be responsible for complying with any legislation or regulations governing the use of the products and their importation into the country of destination (for the avoidance of doubt to include, without limitation, the TSCA and all its amendments, all EINECS, ELINCS and NONS regulations). If any licence or consent of any government or other authority shall be required for the acquisition, carriage or use of the products by the buyer the buyer shall obtain the same at its own expense and if necessary produce evidence of the same to Iris Biotech GmbH on demand. Failure to do so shall not entitle the buyer to withhold or delay payment. Any additional expenses or charges incurred by Iris Biotech GmbH resulting from such failure shall be for the buyer's account. Save for death or personal injury caused by negligence of Iris Biotech GmbH, sole obligation of Iris Biotech GmbH and buyer's exclusive remedy with respect to the products proved to the satisfaction of Iris Biotech GmbH to be defective or products incorrectly supplied shall be to accept the return of said products to Iris Biotech GmbH for refund of the actual purchase price paid by the buyer (or proportionate part thereof), or replacement of the defective product (or part thereof) with alternative product. Iris Biotech GmbH shall have no liability to the buyer under or arising directly or indirectly out of or otherwise in connection with the supply of products by Iris Biotech GmbH to the buyer and/or their re-sale or use by the buyer or for any product, process or services of the buyer which in any way comprises the product in contract tort (including negligence or breach of statutory duty) or otherwise for pure economic loss, loss of profit, business, reputation, depletion of brand, contracts, revenues or anticipated savings or for any special indirect or consequential damage or loss of any nature except as may otherwise be expressly provided for in these terms. All implied warranties, terms and representations in respect of the products (whether implied by statute or otherwise) are excluded to the fullest extent permitted by law. The buyer shall indemnify Iris Biotech GmbH for and against any and all losses, damages and expenses, including legal fees and other costs of defending any action, that Iris Biotech GmbH may sustain or incur as a result of any act or omission by the buyer, its officers, agents or employees, its successors or assignees, its customers or all other third parties, whether direct or indirect, in connection with the use of any product. For the avoidance of doubt and in the event that Iris Biotech GmbH supplies bespoke or custom product to the buyer's design or specification, this indemnity shall extend to include any claim by a third party that the manufacture of the product for the buyer or the use of the product by the buyer infringes the intellectual property rights of any third party.

General

Iris Biotech GmbH shall be entitled to assign or sub-contract all or any of its rights and obligations hereunder. The buyer shall not be entitled to assign, transfer, sub-contract or otherwise delegate any of its rights or obligations hereunder. Any delay or forbearance by Iris Biotech GmbH in exercising any right or remedy under these terms shall not constitute a waiver of such right or remedy. If any provision of these terms is held by any competent authority to be invalid or unenforceable in whole or in part the validity of the other provisions of these terms and the remainder of the provision in question shall not be affected. These terms shall be governed by German Law and the German Courts shall have exclusive jurisdiction for the hearing of any dispute between the parties save in relation to enforcement where the jurisdiction of the German Courts shall be non-exclusive.

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