

Protection And Deprotection Of Functional Groups In

Protecting group

academic literature. Orthogonal protection is a strategy allowing the specific deprotection of one protective group in a multiply-protected structure.

A protecting group or protective group is introduced into a molecule by chemical modification of a functional group to obtain chemoselectivity in a subsequent chemical reaction. It plays an important role in multistep organic synthesis.

In many preparations of delicate organic compounds, specific parts of the molecules cannot survive the required reagents or chemical environments. These parts (functional groups) must be protected. For example, lithium aluminium hydride is a highly reactive reagent that usefully reduces esters to alcohols. It always reacts with carbonyl groups, and cannot be discouraged by any means. When an ester must be reduced in the presence of a carbonyl, hydride attack on the carbonyl must be prevented. One way to do so converts the carbonyl into an acetal, which does...

Dioxolane

containing carbonyl groups sometimes need protection so that they do not undergo reactions during transformations of other functional groups that may be present

Dioxolane is a heterocyclic acetal with the chemical formula (CH₂)₂O₂CH₂. It is related to tetrahydrofuran (THF) by replacement of the methylene group (CH₂) at the 2-position with an oxygen atom. The corresponding saturated 6-membered C₄O₂ rings are called dioxanes. The isomeric 1,2-dioxolane (wherein the two oxygen centers are adjacent) is a peroxide. 1,3-dioxolane is used as a solvent and as a comonomer in polyacetals.

Tosyl group

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In organic chemistry, a toluenesulfonyl group (tosyl group, abbreviated Ts or Tos) is a univalent functional group with the chemical formula –SO₂–C₆H₄–CH₃. It consists of a tolyl group, –C₆H₄–CH₃, joined to a sulfonyl group, –SO₂–, with the open valence on sulfur. This group is usually derived from the compound tosyl chloride, CH₃C₆H₄SO₂Cl (abbreviated TsCl), which forms esters and amides of toluenesulfonic acid, CH₃C₆H₄SO₂OH (abbreviated TsOH). The para orientation illustrated (p-toluenesulfonyl) is most common, and by convention tosyl without a prefix refers to the p-toluenesulfonyl group.

The tosyl terminology was proposed by German chemists Kurt Hess and Robert Pflieger in 1933 on the pattern of trityl and adopted in English starting from 1934.

The toluenesulfonate (or tosylate) group refers...

2-Mercaptoethanol

Giovanna; Maggi, Raimondo; Righi, Paolo (2004). "Protection (and Deprotection) of Functional Groups in Organic Synthesis by Heterogeneous Catalysis". Chem

2-Mercaptoethanol is the organosulfur compound with the formula HOCH₂CH₂SH. ME or βME, as it is commonly abbreviated, is used to reduce disulfide bonds. It is widely used because the hydroxyl group confers solubility in water and lowers the volatility. Due to its diminished vapor pressure, its odor, while unpleasant, is less objectionable than related thiols.

Fluorenylmethyloxycarbonyl protecting group

acids and hydrolysis and its selective removal by weak bases, such as piperidine, without affecting most other protecting groups or sensitive functional groups

The fluorenylmethoxycarbonyl protecting group (Fmoc) is a base-labile amine protecting group used in organic synthesis, particularly in peptide synthesis. It is popular for its stability toward acids and hydrolysis and its selective removal by weak bases, such as piperidine, without affecting most other protecting groups or sensitive functional groups. Fmoc protection is especially advantageous in solid-phase peptide synthesis (SPPS), where its compatibility with other reagents and ease of removal streamline synthesis workflows. Upon deprotection, Fmoc yields a byproduct (Dibenzofulvene) that can be monitored by UV spectroscopy, allowing for efficient reaction tracking.

Acetoxy group

and, when present, more powerful nucleophiles like amines will react with the above-mentioned reagents in preference to the alcohol. For deprotection

In organic chemistry, the acetoxy group (abbr. AcO- or -OAc; IUPAC name: acetyloxy), is a functional group with the formula $-\text{OCOCH}_3$ and the structure $-\text{O}-\text{C}(=\text{O})-\text{CH}_3$. As the -oxy suffix implies, it differs from the acetyl group ($-\text{C}(=\text{O})-\text{CH}_3$) by the presence of an additional oxygen atom. The name acetoxy is the short form of acetyl-oxy.

Silylation

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Silylation is the introduction of one or more (usually) substituted silyl groups (R_3Si) to a molecule. Silylations are core methods for production of organosilicon chemistry. Silanization, while similar to silylation, usually refers to attachment of silyl groups to solids. Silyl groups are commonly used for: alcohol protection, enolate trapping, gas chromatography, electron-impact mass spectrometry (EI-MS), and coordinating with metal complexes.

Silyl ether

Fluoride-based deprotections deprotect electron-poor silyl groups faster than electron-rich silyl groups. There is some evidence that some silyl deprotections proceed

Silyl ethers are a group of chemical compounds which contain a silicon atom covalently bonded to an alkoxy group. The general structure is $\text{R}_1\text{R}_2\text{R}_3\text{Si}-\text{O}-\text{R}_4$ where R_4 is an alkyl group or an aryl group. Silyl ethers are usually used as protecting groups for alcohols in organic synthesis. Since $\text{R}_1\text{R}_2\text{R}_3$ can be combinations of differing groups which can be varied in order to provide a number of silyl ethers, this group of chemical compounds provides a wide spectrum of selectivity for protecting group chemistry. Common silyl ethers are: trimethylsilyl (TMS), tert-butyldiphenylsilyl (TBDPS), tert-butyldimethylsilyl (TBS/TBDMS) and triisopropylsilyl (TIPS). They are particularly useful because they can be installed and removed very selectively under mild conditions.

Benzylidene acetal

Tokuyama; Tohru Fukuyama (2009). "Protection Of Diols With 4-(Tert-butyldimethylsilyloxy)benzylidene Acetal And Its Deprotection". Org. Synth. 86: 130. doi:10

In organic chemistry, a benzylidene acetal is the functional group with the structural formula $\text{C}_6\text{H}_5\text{CH}(\text{OR})_2$ (R = alkyl, aryl). Benzylidene acetals are used as protecting groups in glycochemistry. These compounds can also be oxidized to carboxylic acids in order to open important biological molecules, such as glycosaminoglycans, to other routes of synthesis. They arise from the reaction of a 1,2- or 1,3-diols with benzaldehyde. Other aromatic aldehydes are also used.

2-(Trimethylsilyl)ethoxymethyl chloride

Alexandros; Hoffmann, H. M. R. (2000-04-21). "Novel Deprotection of SEM Ethers: A Very Mild and Selective Method Using Magnesium Bromide". Organic Letters

2-(Trimethylsilyl)ethoxymethyl chloride (SEM-Cl) is an organochlorine compound with the formula $\text{C}_6\text{H}_{15}\text{ClOSi}$, which was developed by Bruce H. Lipshutz during his work on the synthesis of N-methylmaysenine. It is used to protect hydroxyl groups, which can be cleaved with fluoride in organic solvents selectively under mild conditions. Typically tetrabutylammonium fluoride and caesium fluoride can be used as deprotection reagents. Alternatives such as magnesium bromide, lithium tetrafluoroborate and boron trifluoride etherate were also developed to deprotect SEM group.

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