Organosilanes

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Organosilanes

Organosilanes are widely used in organic chemistry, particularly as protecting groups[1,2], derivatisation reagents[3], reducing agents[4] and synthetic intermediates. The extensive Thermo Scientific portfolio has been developed to facilitate all of these applications.

Silicon protecting groups

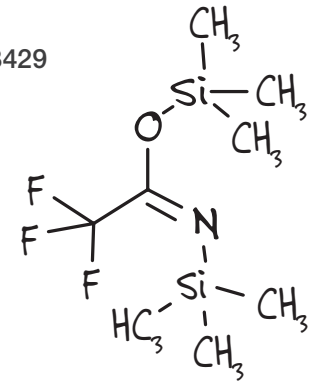
Silylating agents are mostly used to protect alcohols and phenols, but have also found application in the protection of amines, carboxylic acids, amides, thiols and alkynes. Replacement of the Trimethylsilyl (TMS) group by tert-butyl gives a tert-butyldimethylsilyl (TBDMS) group, which is considerably more stable than the TMS group.

Within the Thermo Scientific range we offer tert-Butyldimethylchlorosilane (TBDMSCl) [A13064] as well as other common silyl protecting groups including Trimethylsilyl chloride (TMSCl) [A13651]; Triethylsilyl chloride (TESCl) [A15547] and Trisopropylsilyl chloride (TIPSCl) [A17376].

Derivatization

Derivatization of a compound by reaction with a silylating agent is of particular use in gas chromatography (GC) analysis. Molecules containing functional groups such as carboxylic acid, hydroxyl, amine, thiol and phosphate, which may be difficult to analyse by GC, can be readily converted into silylated derivatives which are generally less polar, more volatile and have greater thermal stability and are therefore more suitable for GC analysis. N,O-Bis(trimethylsilyl)trifluoroacetamide[5], (BSTFA) [43429] is a powerful analytical silylation reagent. The by-products and the reagent itself are highly volatile so cause minimal interference with the GC analysis.

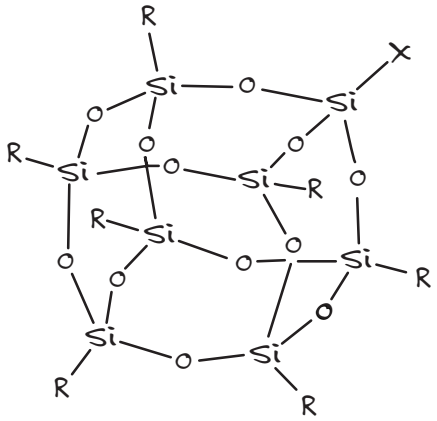
BSTFA, 43429



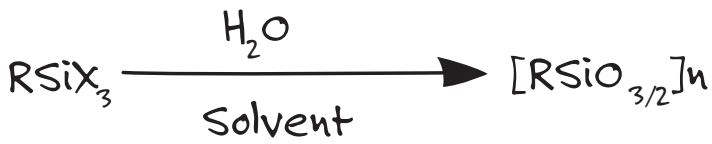
Synthetic intermediates

There is a growing need for orgnosilanes in the field of silicon containing organic polymers, whose potential applications include electronic and optical materials, catalysts and coatings.[6] Hydrolytic condensation of trifunctional silanes yields silsesquioxanes, where each silicon atom is bound to an average of one and a half oxygen atoms and to one hydrocarbon group. Among various types of silsesquioxanes, polyhedral oligomeric silsesquioxane (POSSTM) reagents offer a unique opportunity for preparing hybrid organic-inorganic materials with the inorganic structural units truly molecularly dispersed within the nanocomposites.

General structure of POSSTM reagents



Under the Thermo Scientific brand we have several trichlorosilanes which are useful precursors to silsesquioxanes, with examples such as [A11256], [A15732], [B23107] & [B23753]. All follow the general formula shown below.



Organosilicon alkynes

Alkynes are highly reactive and the triple bond can exert remarkable effects on the rest of the molecule through a combination of characteristic properties. A number of new organosilicon alkynes derivatives are now available through Thermo Scientific, and many have already been extensively cited in scientific literature.

Researchers at MIT have proposed a two-stage “tandem strategy” for the synthesis of benzofused nitrogen heterocycles, via a benzannulation based on the reaction of cyclobutenones with ynamides derived from H53375.[7] Several groups have described the development of a rhodium-catalyzed asymmetric isomerization of racemic α-arylpropargyl alcohols to α-chiral indanones[8] of H53426. Similarly, cobalt-catalyzed carbocylization has been used for the synthesis of indenols and indenes using H53517, in high yield and excellent regioselectivity.[9] In a synthetic approach toward the natural product cytostatin, an inhibitor of protein phosphatase 2A, the subunit of cytostatin has been prepared in a six steps from H53517.[10] A convenient preparation of functionalized benzo[c]selenophenes involves treatment of isoselenocyanate with lithiated o-bromoethynylbenzenes (H53402).[11] Recent patents have shown that H53487 to be effective component of pharmaceutically active compounds such as potential metalloproteinase inhibitors,[12] in the treatment of cystic fibrosis,[13] or the treatment of vascular diseases.[14]

A selection of the organosilicon alkynes are listed below.

Fisher Scientific Cat. No.	Description	Size	CAS No.
AAH53402	(2-Bromophenylethynyl)trimethylsilane, 98%	1 g, 5 g, 25 g	38274-16-7
AAH53515	1-Chloro-5-triethylsilyl-4-pentyne, 97%	5 g, 25 g	174125-30-5
AAH53393	1-Chloro-5-trimethylsilyl-4-pentyne, 97%	5 g, 25 g	77113-48-5
AAH53375	1-Iodo-2-(trimethylsilyl)acetylene, 97%	1 g, 5 g, 25 g	18163-47-8
AAH53426	1-Phenyl-3-trimethylsilyl-2-propyn-1-ol, 98%	5 g, 25 g	89530-34-7
AAH53488	1-Triethylsilyl-4-triethylsilyloxy-1-butyne, 97%	5 g, 25 g	160194-28-5
AAH53423	1-Trimethylsilyl-1-pentyne, 98%	5 g, 25 g, 100 g	18270-17-2
AAH53436	1-Trimethylsilyl-1,4-pentadiyne, 98%	1 g, 5 g, 25 g	71789-10-1
AAH53397	3-(Trimethylsilyl)propiolaldehyde diethyl acetal, 97%	5 g, 25 g	87219-80-5
AAH53380	3-(Trimethylsilyl)propiolic acid, 97%	1 g, 5 g, 25 g	5683-31-8
AAH53376	4-Trimethylsilyl-3-butyn-1-ol, 98%	5 g, 25 g	2117-12-6
AAH53457	5-Trimethylsilyl-4-pentyn-1-ol, 97%	5 g, 25 g	13224-84-5
AAH53487	Cyclopropyl(trimethylsilyl)acetylene, 97%	5 g, 25 g	81166-84-9
AAH53517	Ethyl 3-(trimethylsilyl)propiolate, 98%	1 g, 5 g, 25 g	16205-84-8
AAH53494	tert-Butyldimethylsilylacetylene, 98%	1 g, 5 g, 25 g	86318-61-8
AAH53405	Triisopropylsilylacetylene, 97%	5 g, 25 g	89343-06-6

Full product listing is available online.

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For your convenience the products listed throughout the brochure are detailed below.

Silicon protecting groups

Fisher Scientific Cat. No.	Description	Size	CAS No.
AAA15547	Chlorotriethylsilane, 98+%	10 g, 50 g, 250 g	994-30-9
AAA17376	Chlorotriisopropylsilane, 97+%	10 g, 50 g, 250 g	13154-24-0
AAA13651	Chlorotrimethylsilane, 98+%	25 mL, 100 mL, 500 mL	75-77-4
AAA13064	tert-Butyldimethylchlorosilane, 97%	5 g, 25 g, 100 g	18162-48-6

Full product listing is available online.

Synthetic intermediates

Fisher Scientific Cat. No.	Description	Size	CAS No.
AAB23107	Methyltrichlorosilane, 97%	100 g, 500 g	75-79-6
AAA11256	n-Butyltrichlorosilane, 97+%	25 g, 100 g	7521-80-4
AAA15732	n-Octadecyltrichlorosilane, 95%, cont. 5-10% branched isomers	50 g, 250 g, 1 kg	112-04-9
AAB23753	n-Octyltrichlorosilane, 97%	25 g, 100 g, 500 g	5283-66-9

Full product listing is available online.

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