

# Organosilanes

Organosilanes are widely used in organic chemistry, particularly as protecting groups<sup>1,2</sup>, derivatisation reagents<sup>3</sup>, reducing agents<sup>4</sup> and synthetic intermediates. The extensive Alfa Aesar™ 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.

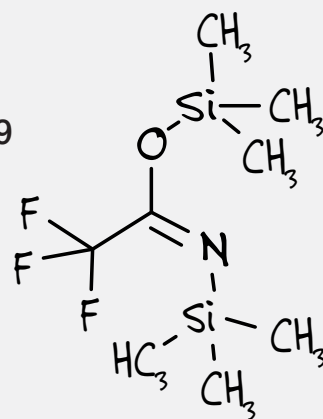
Within the Alfa Aesar range we offer tert-Butyldimethylchlorosilane (TBDMSCl) [A13064] as well as other common silyl protecting groups including Trimethylsilyl chloride (TMSCl) [A13651]; Triethylsilyl chloride (TESCl) [A15547] and Trisopropylsilyl chloride (TIPSCl) [A17376].

## 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<sup>5</sup>, (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.

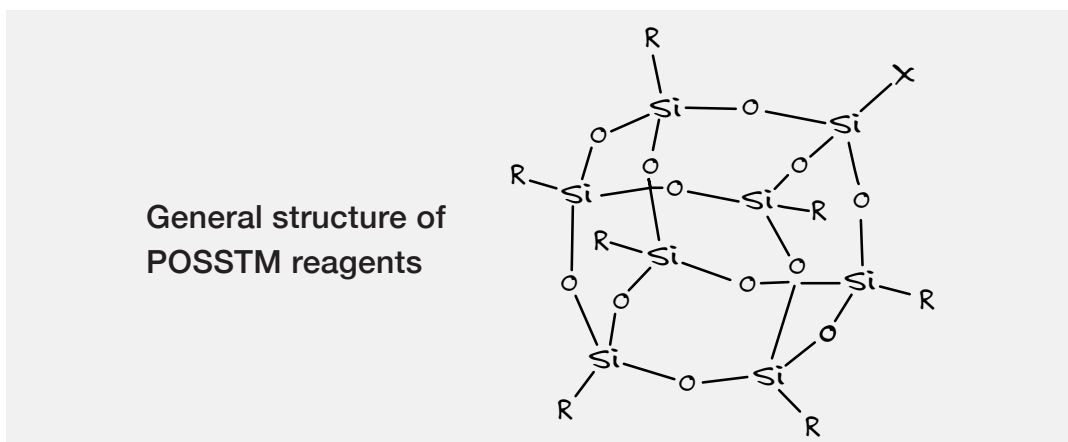
BSTFA, 43429



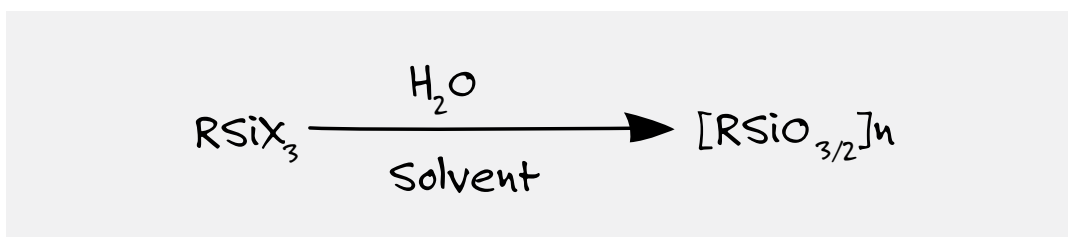
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## Synthetic intermediates

There is a growing need for organosilanes in the field of silicon containing organic polymers, whose potential applications include electronic and optical materials, catalysts and coatings.<sup>6</sup> 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.



Under the Alfa Aesar 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 Alfa Aesar, 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.<sup>7</sup> Several groups have described the development of a rhodium-catalyzed asymmetric isomerization of racemic  $\alpha$ -arylpropargyl alcohols to  $\alpha$ -chiral indanones<sup>8</sup> of H53426. Similarly, cobalt-catalyzed carbocyclization has been used for the synthesis of indenols and indenes using H53517, in high yield and excellent regioselectivity.<sup>9</sup> In a synthetic approach toward the natural product cytoostatin, an inhibitor of protein phosphatase 2A, the subunit of cytoostatin has been prepared in a six steps from H53517.<sup>10</sup> A convenient preparation of functionalized benzo[c]selenophenes involves treatment of isoselenocyanate with lithiated o-bromoethynylbenzenes (H53402).<sup>11</sup> Recent patents have shown that H53487 to be effective component of pharmaceutically active compounds such as potential metalloproteinase inhibitors,<sup>12</sup> in the treatment of cystic fibrosis,<sup>13</sup> or the treatment of vascular diseases.<sup>14</sup>

A selection of the organosilicon alkynes offered by Alfa Aesar are listed below.

VWR Cat. No.	Description	Size	CAS No.
H53402	(2-Bromophenylethynyl)trimethylsilane, 98%	1g, 5g, 25g	38274-16-7
H53515	1-Chloro-5-triethylsilyl-4-pentyne, 97%	5g, 25g	174125-30-5
H53393	1-Chloro-5-trimethylsilyl-4-pentyne, 97%	5g, 25g	77113-48-5
H53375	1-Iodo-2-(trimethylsilyl)acetylene, 97%	1g, 5g, 25g	18163-47-8
H53426	1-Phenyl-3-trimethylsilyl-2-propyn-1-ol, 98%	5g, 25g	89530-34-7
H53488	1-Triethylsilyl-4-triethylsilyloxy-1-butyne, 97%	5g, 25g	160194-28-5
H53423	1-Trimethylsilyl-1-pentyne, 98%	5g, 25g, 100g	18270-17-2
H53436	1-Trimethylsilyl-1,4-pentadiyne, 98%	1g, 5g, 25g	71789-10-1
H53397	3-(Trimethylsilyl)propionaldehyde diethyl acetal, 97%	5g, 25g	87219-80-5
H53380	3-(Trimethylsilyl)propionic acid, 97%	1g, 5g, 25g	5683-31-8
H53376	4-Trimethylsilyl-3-butyn-1-ol, 98%	5g, 25g	2117-12-6
H53457	5-Trimethylsilyl-4-pentyn-1-ol, 97%	5g, 25g	13224-84-5
H53487	Cyclopropyl(trimethylsilyl)acetylene, 97%	5g, 25g	81166-84-9
H53517	Ethyl 3-(trimethylsilyl)propiolate, 98%	1g, 5g, 25g	16205-84-8
H53494	tert-Butyldimethylsilylacetylene, 98%	1g, 5g, 25g	86318-61-8
H53405	Triisopropylsilylacetylene, 97%	5g, 25g	89343-06-6

Full product listing is available online.

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

### Silicon protecting groups

VWR Cat. No.	Description	Size	CAS No.
A15547	Chlorotriethylsilane, 98+%	10g, 50g, 250g	994-30-9
A17376	Chlorotriisopropylsilane, 97+%	10g, 50g, 250g	13154-24-0
AA13651	Chlorotrimethylsilane, 98+%	25ml, 100ml, 500ml	75-77-4
A13064	tert-Butyldimethylchlorosilane, 97%	5g, 25g, 100g	18162-48-6

Full product listing is available online.

### Synthetic intermediates

VWR Cat. No.	Description	Size	CAS No.
B23107	Methyltrichlorosilane, 97%	100g, 500g	75-79-6
A11256	n-Butyltrichlorosilane, 97+%	25g, 100g	7521-80-4
A15732	n-Octadecyltrichlorosilane, 95%, cont. 5-10% branched isomers	50g, 250g, 1kg	112-04-9
B23753	n-Octyltrichlorosilane, 97%	25g, 100g, 500g	5283-66-9

Full product listing is available online.

## References

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