Alfa Aesar

Organosilanes

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

Silicon protecting groups

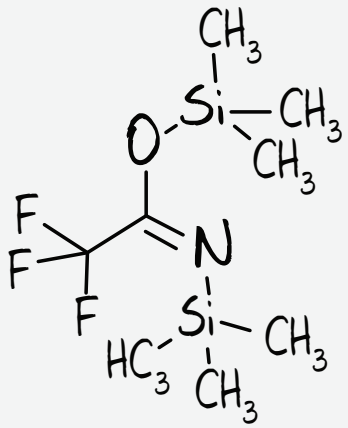
Silylating agents are mostly used to protect alcohols and phenols, but are also used for the protection of amines, carboxylic acids, amides, thiols, and alkynes. Replacement of the Trimethylsilyl (TMS) group by tert-butyl gives a tert-butyldimethylsilyl (TBDMS) group, which is considerably more stable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

Within the Alfa Aesar range we offer tert-Butyldimethylchlorosilane (TBDMSCl) [AAA13064] as well as other common silyl protecting groups including Trimethylsilyl chloride (TMSCl) [AAA13651], Triethylsilyl chloride (TESCl) [AAA15547], and Trisopropylsilyl chloride (TIPSCl) [AAA17376].

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 analyze 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) is a powerful analytical silylation reagent. The by-products and the reagent itself are highly volatile and cause minimal interference with the GC analysis.

BSTFA

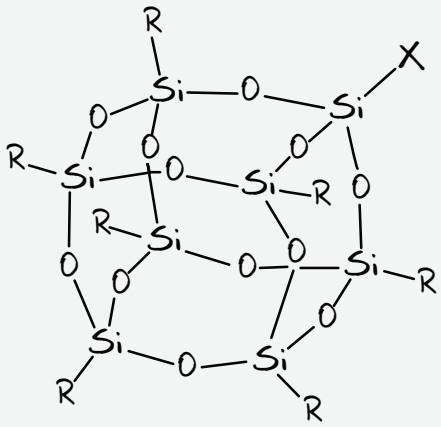


fisher scientific
part of Thermo Fisher Scientific

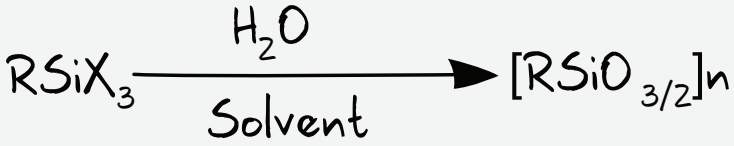
Synthetic intermediates

There is a growing need for orgnosilanes in the field of silicone-containing organic polymers. 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



The Alfa Aesar portfolio includes several trichlorosilanes that are useful precursors to silsesquioxanes. Examples include catalog numbers AAA11256, AAA15732, AAB23107, and AAB23753. 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 from the Alfa Aesar brand, 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 1-Iodo-2-(trimethylsilyl)acetylene [AAH53375].[7] Several groups have described the development of a rhodium-catalyzed asymmetric isomerization of racemic à-arylpropargyl alcohols to á-chiral indanones[8] of 1-Phenyl-3-trimethylsilyl-2-propyn-1-ol [AAH53426]. Similarly, cobalt-catalyzed carbocylization has been used for the synthesis of indenols and indenes using AAH53517, 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 six steps from Ethyl 3-(trimethylsilyl)propiolate.[10] A convenient preparation of functionalized benzo[c]selenophenes involves treatment of isoselenocyanate with lithiated o-bromoethynylbenzenes [AAH53402].[11] Recent patents have shown Cyclopropyl(trimethylsilyl)acetylene [AAH53487] to be effective as a component of pharmaceutically active compounds such as potential metalloproteinase inhibitors[12] and in the treatment of cystic fibrosis[13] or vascular diseases.[14]

A selection of Alfa Aesar Organosilicon Alkynes and products mentioned throughout this brochure are listed below.

Cat. No.	Description	Size	CAS No.
AC43094	(3-Aminopropyl)triethoxysilane, 99%	100mL, 800mL	919-30-2
AAH53402	(2-Bromophenylethynyl)trimethylsilane, 98%	1g, 5g, 25g	38274-16-7
AC43869	(3-Bromopropoxy)-tert-butyldimethylsilane, stabilized over sodium carbonate, 97%	1mL, 5mL, 25mL	89031-84-5
AAH53393	1-Chloro-5-trimethylsilyl-4-pentyne, 97%	5g, 25g	77113-48-5
AC31338	3-Cyanopropyldimethylchlorosilane, 90%	10mL, 50mL	18156-15-5
AC43307	1,1,3,3,5,5-Hexamethyltrisiloxane, >95%	100mL	1189-93-1
AAH53375	1-Iodo-2-(trimethylsilyl)acetylene, 97%	1g, 5g, 25g	18163-47-8
AAH53426	1-Phenyl-3-trimethylsilyl-2-propyn-1-ol, 98%	5g, 25g	89530-34-7
AC43221	(3,3,3-Trifluoropropyl)chlorodimethylsilane, 95%	5g, 25g	1481-41-0
AAH53423	1-Trimethylsilyl-1-pentyne, 98%	5g, 25g, 100g	18270-17-2
AAH53436	1-Trimethylsilyl-1,4-pentadiyne, 98%	1g, 5g, 25g	71789-10-1
AAH53376	4-Trimethylsilyl-3-butyn-1-ol, 98%	5g, 25g	2117-12-6
AAH53457	5-Trimethylsilyl-4-pentyn-1-ol, 97%	5g, 25g	13224-84-5
AC43075	Bromotrimethylsilane, 98%	100mL	2857-97-8
AC31350	Chlorodimethylethylsilane, 97%	5g, 25g	6917-76-6
AC43325	Chlorotriethylsilane solution 1.0 M in tetrahydrofuran	100mL	994-30-9
AC31393	Cyclohexylmethyldichlorosilane, 98%	5g, 25g	995-25-5
AC43222	Cyclohexylmethyldichlorosilane, 97%	10mL, 50mL	5578-42-7
AAH53487	Cyclopropyl(trimethylsilyl)acetylene, 97%	5g, 25g	81166-84-9
AC31337	Dichloro(chloromethyl)methylsilane, 98%	25g, 100g	1558-33-4
AC43088	Dichlorodimethylsilane, ≥99.5%	100mL, 800mL	75-78-5
AC43089	Dichlorodiphenylsilane, ≥97%	100mL, 800mL	80-10-4
AC31344	Diisopropylchlorosilane, 95%	5g	2227-29-4
AC43236	Diisopropyldichlorosilane, 97%	5g, 25g	7751-38-4
AAH53517	Ethyl 3-(trimethylsilyl)propiolate, 98%	1g, 5g, 25g	16205-84-8
AC43308	Ethyltrimethoxysilane, ≥97%	100mL, 1L	5314-55-6
AC43085	Hexamethyldisilazane, 98%	100mL, 1L	999-97-3
AC31357	Isopropyldimethylchlorosilane, 95%	25g	3634-56-8
AC43264	Methyltrimethoxysilane, 97%	100mL, 1L	1185-55-3
AC43226	n-Butyldimethylchlorosilane, 97+%	10mL, 50mL	1000-50-6
AC43560	n-Butyltrichlorosilane, 99%	25mL	7521-80-4
AC14741	n-Propyltrichlorosilane, 98%	100mL, 1L	141-57-1
AC43224	Phenethyltrichlorosilane, 95%	1g	940-41-0
AC43311	tert-Butyldimethylsilyl chloride, 50% solution in toluene	100mL	18162-48-6
AC43092	tert-Butyl(chloro)diphenylsilane, 98%	100mL	58479-61-1
AAH53494	tert-Butyldimethylsilylacetylene, 98%	1g, 5g, 25g	86318-61-8
AAH53405	Triisopropylsilylacetylene, 97%	5g, 25g	89343-06-6
AC43490	Trioctylsilane, 95%	5g, 25g	18765-09-8

Full product listing is available online.

Silicon protecting groups

Alfa Aesar Cat. No.	Acros Organics Cat. No.	Description	Size	CAS No.
AAA15547	AC43325	Chlorotriethylsilane	100mL	994-30-9
AAA17376	AC37735	Chlorotriisopropylsilane	5g, 25g, 100g	13154-24-0
AAA13651	AC11012	Chlorotrimethylsilane	25mL, 100mL, 250mL, 1L, 2.5L	75-77-4
AAA13064	AC18393	tert-Butyldimethylchlorosilane	5g, 25g, 100g, 500g	18162-48-6

Full product listing is available online.

Synthetic intermediates

Alfa Aesar Cat. No.	Acros Organics Cat. No.	Description	Size	CAS No.
AAB23107	AC12793	Methyltrichorosilane	10mL, 500mL, 2.5L	75-79-6
AAA11256	AC43560	n-Butyltrichlorosilane	25mL	7521-80-4
AAA15732	AC14740	Octadecyltrichlorosilane	25mL, 100mL, 500mL	112-04-9
AAB23753	AC21650	Octyltrichlorosilane	100g, 500g	5283-66-9

Full product listing is available online.

References

1 Greene,T.; Wuts, P. G. M. Protecting Groups in Organic Synthesis. 2nd Ed. Wiley, New York. **1991**.

2 Kocienski, P. J. Protecting Groups. 3rd Ed. Thieme: Stuttgart. **1994**.

3 Blau, K.; Halket J. Handbook of Derivatives for Chromatography. 2nd Ed. J. Wiley and Sons, New York. **1993**.

4 Chatgilialoglu, C. Organosolanes as radical-based reducing agents in synthesis. Acc. Chem. Res.**1992**, 25, 188.

5 Stalling, D. L.; et al., Biochem. Biophys. Res.Commun. **1968**, 31, 616.

6 Hartmann-Thompson, C. (Ed.); Applications of Polyhedral Oligomeric Silsesquioxanes - Advances in Silicon Science, Vol. 3; 1st Ed. **2011**.

7 (a) Mak, X. Y.; Crombie, A. L.; Danheiser, R. L. J. Org. Chem. **2011**, 76, 1852.
(b) Kohnen,A. L.; Xiao,Y. M.; Tin, Y. L.; Dunetz, J. R.; Danheiser, R. L. Tetrahedron. **2006**, 62, 3815.

8 (a) Shintani, R.; Okamoto, K.; Hayashi, T. J. Am. Chem. Soc. **2005**, 127, 2872.
(b) Yamabe, H.; Mizuno, A.; Kusama, H.; Iwasawa, N. J. Am. Chem. Soc. **2005**, 127, 3248.
(c) Kundu, K.; McCullagh, J. V.; Morehead Jr., A. T. J. Am. Chem. Soc. **2005**, 127, 16042.

9 Chang, K. -J.; Rayabarapu, D. K.; Cheng, C.-H. J. Org. Chem. **2004**, 69, 4781.

10 Salit, A.-F.; Meyer, C.; Cossy, J.; Delouvrie, B.; Hennequin, L. Tetrahedron, **2008**, 64, 6684.

11 Kaname, M.; Sashida, H. Tetra. Lett. **2011**, 52, 3279.

12 Wyeth, Patent: US2005/143422 A1, **2005**.

13 Vertex Pharmaceuticals Incorported, Patent: US2011/98311 A1, **2011**.

14 Dhar, T.G M.; Xiao, H.-Y; Watterson, S. H.; Ko, S. S.; Dyckman, A. J.; Langevine, C. M.; Das, J.; Cherney, R. J.
Bristol-Myers Squibb Company Patent: WO2011/59784 A1, **2011**.

Visit **fishersci.com** to order.

Alfa Aesar

In the United States
Order online: fishersci.com
Fax an order: 1-800-926-1166
Call customer service: 1-800-766-7000

fisher scientific
part of Thermo Fisher Scientific

18-2837 KP 1/19 BN040317CH76