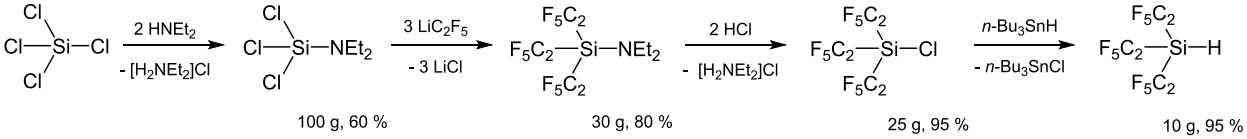
Improved synthesis and reactivity of the tris(pentafluoroethyl)silanide ion

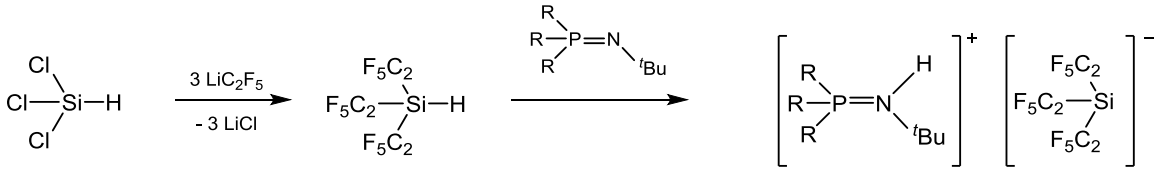
Natalia Tiessen, Nico Schwarze, Berthold Hoge*

Bielefeld University, Center for Molecular Materials, 33615 Bielefeld, Germany,
E-Mail: b.hoge@uni-bielefeld.de

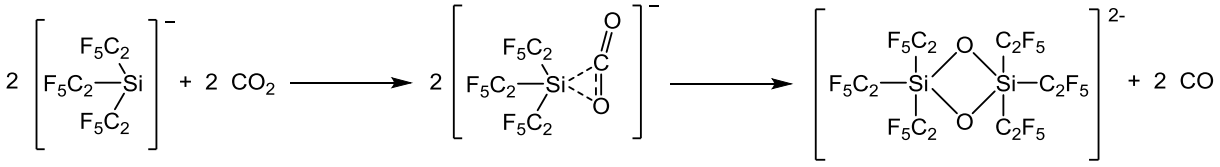
The literature-known synthesis of tris(pentafluoroethyl)silanide salts[1] proceeds via the deprotonation of $Si(C_2F_5)_3H$, which is synthesized via four steps:[2]



The reaction of commercially available $SiCl_3H$ with *in situ* generated LiC_2F_5 [3] allows an access of $Si(C_2F_5)_3H$ within one step. The subsequent treatment of the resulting Et_2O solution with neutral phosphazene bases $R_3P{=}N^tBu$ (R = -N=P(NEt$_2$)$_3$ and -NC(NMe$_2$)$_2$) leads to a two-step synthesis of the corresponding $[R_3PN(H)^tBu]^+[Si(C_2F_5)_3]^-$ salts.



The $[Si(C_2F_5)_3]^-$ ion exhibits Lewis amphoteric character and adds carbonyl derivatives side-on. An intermediary addition of CO_2 leads to a liberation of CO and a dimerization of the resulting silanolate ions.



[1] N. Schwarze, S. Steinhauer, B. Neumann, H.-G. Stammler, B. Hoge, *Angew. Chem*. **2016,** *128,* 16390-16394. N. Schwarze, S. Steinhauer, B. Neumann, H.-G. Stammler, B. Hoge, *Angew. Chem.*, **2016,** *128*, 16395-16398.

[2] S. Steinhauer, J. Bader, H.-G. Stammler, N. Ignat'ev, B. Hoge, *Angew. Chem.*, **2014,** *126*, 5307-5310

[3] M. Heinrich, A. Marhold, A. Kolomeitsev, A. Kadyrov, G.-V. Röschenthaler, J. Barten (Bayer AG), DE 10128703A 1, **2001**; M. H. Königsmann, Dissertation, Universität Bremen, **2005**; A. A. Kolomeitsev, A. A. Kadyrov, J. Szczepkowska-Sztolcman, H. Milewska, G. Bissky, J. A. Barten, G.-V. Röschenthaler, Tetrahedron Lett. **2003**, *44*, 8273–8277