technische universität
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EINLADUNG

Im Rahmen der gemeinsamen Kolloquien der Fakultät für Chemie und Chemische Biologie der Technischen Universität Dortmund hält

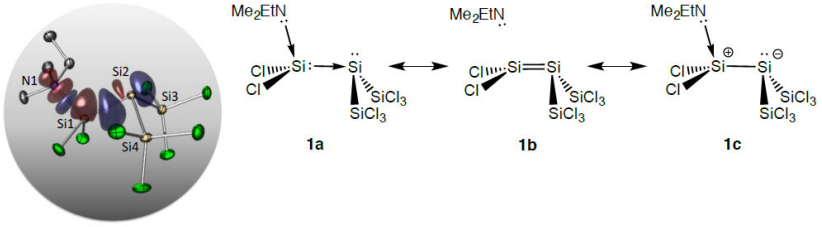
Prof. Dr. Max C. Holthausen

Institut für Anorganische und Analytische Chemie, Goethe-Universität Frankfurt

einen Vortrag mit dem Thema:

"Taming the Dichlorosilylene – Theoretical Perspectives on Selectivity in Silicon Chemistry"

The gas-phase chemistry of silicon hydrides is of fundamental interest for silicon-based industries, where chemical vapor deposition techniques are in customary use for the fabrication of semiconductor and light-emitting devices, or optical fibers, to name a few. Substantial research efforts have recently led to the preparation of silicon nanowires and thin films including the graphene analog, silicene. These materials have most interesting properties and great application perspectives, but success in this field is severely limited by a fundamental lack of molecular silane precursors exploitable for improved processing techniques. Consequently, the development of efficient synthetic strategies for the selective preparation
of well-defined oligosilanes represents a highly rewarding research goal.
The reaction of $SiCl_4$ with H_2 in a cold plasma offers efficient access to perchlorinated oligosilanes Si_nCl_{2n+2} (n=2–12) with baffling selectivity. This class of compounds represents, inter alia, a most useful feedstock for the synthesis of (perhydro)oligosilanes. The lecture outlines our current understanding of this unique reaction. Further, recent mechanistic work on the reactivity of perchlorinated oligosilanes is presented, which allows for a rationalization of factors that govern selectivity and surprising self-organization effects observed in experiments.[1-3] Theory provides a unifying view on the reactivity of activated or moderately tamed dichlorosilylenes that occur as key intermediates in the transformations. In the course of these studies, we also developed surprisingly simple solutions for long-lasting, vexing problems of key industrial relevance, such as the selective and quantitative 'reduction' of $SiCl_4$ to $HSiCl_3$ and the selective preparation of bifunctional silanes R_2SiHCl.[4]



Molecular structure and bonding analysis of an unprecedented disilene selectively formed in the reaction of Si_2Cl_6 with NMe_2Et.[3]

[1] Tillmann, Meyer, Schweizer, Bolte, Lerner, Wagner, Holthausen, *Chem. Eur. J.* 20, 9234 (2014)
[2] Tillmann, Wender, Bahr, Bolte, Lerner, Holthausen, Wagner, *Angew. Chem. Int. Ed.* 54, 5429 (2015)
[3] Schweizer, Diefenbach, Scheibel, Neumeyer, Würtele, Kulminskaya, Linser, Auner, Schneider, Holthausen, *Angew. Chem. Int. Ed.* 55, 1782 (2016)
[4] Sturm, Karaca, Heinz, Felder, Lewis, Auner, Holthausen, *ChemSusChem* 16 e202201953 (2022)

Zeit: **Dienstag, 14.05.2024, 17:15 Uhr**
Ort: **Campus Nord, Chemiegebäude HS1**

Für die Dozenten der Chemie

Im Auftrag des Dekans

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