

Introduction

Hideki Sakurai

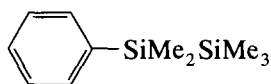


Professor Hideki Sakurai was born in a mountain village in Nara Prefecture on 16th May 1931. Because his father was a dendrologist, he moved many times during his student years. After spending one year at the Fifth Higher School in Kumamoto (in the old system of education), he went to the University of Tokyo in 1949. Since it was the time after World War 2 when the Japanese education system changed drastically, he was one of the first university students of the new education system. He earned his B.Sc. (1953), M.Sc. (1955), and D.Sc. (1958) degrees in chemistry from the University of Tokyo under the guidance of Prof. Osamu Simamura, where he studied the mechanism of radical reactions. In 1958, he was appointed assistant at Osaka City Univer-

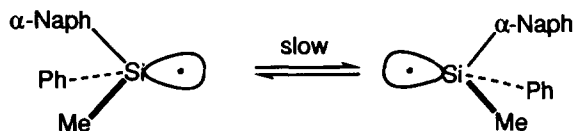
sity and joined the laboratory of Prof. Minoru Imoto, a polymer chemist. He spent one year from September 1960 with Prof. Paul Bartlett at Harvard University to study radical chemistry. It is supposed that his excellent groundings in physical organic chemistry were established during this period.

Prof. Sakurai moved to Kyoto University from Osaka City University in 1962 as an associate professor. He joined the laboratory of Prof. Makoto Kumada [1] where, predestinately, he encountered organosilicon chemistry. In the first experience of organosilicon compounds, he prepared phenylpentamethyldisilane and took the UV-vis spectrum. He was astonished to find an intense absorption band at 231 nm, which disclosed a large red shift of

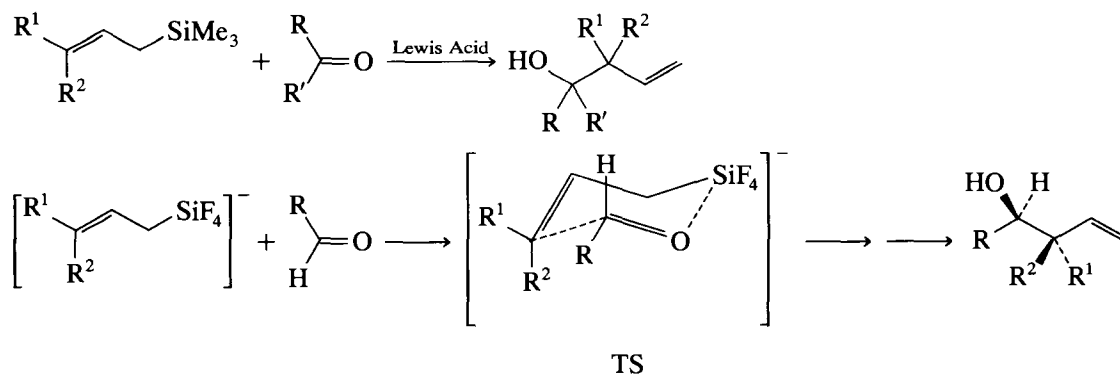
the 1L_a band of benzene [2]. Together with other reports published at almost the same time, the results established the first observation of the “conjugation” of aromatic π bonds and Si–Si σ bonds. The origin of the conjugation had been pursued extensively and recognized by many spectroscopic studies finally as the consequence of the $\sigma(\text{Si–Si})-\pi$ conjugation to cause the lift of the HOMO level. Since then, he has been fascinated by the unique and marvelous character of Si–Si bonds.



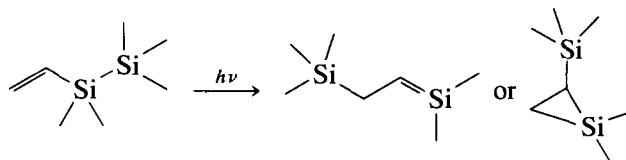
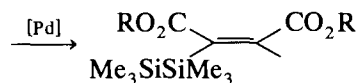
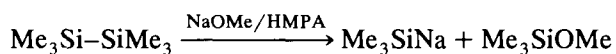
In the early stage of his study, Prof. Sakurai carried out extensive research on the structure and reactivity of silyl radicals [3]. Nucleophilic character of trialkylsilyl radicals was revealed on the basis of the substituent effects on the rates of homolytic aromatic substitution. The first evidence for the non-planar geometry and the slow pyramidal inversion of organosilyl radicals was obtained by studying the reactions of an optically active silane with carbon tetrachloride.



Since Prof. Sakurai was appointed full professor at the Faculty of Science, Tohoku University in 1969, his research interests have expanded to the wide range of the organosilicon field. He developed his studies on generation and reactions of silicon-reactive intermediates such as silyl radicals, silyl anions, silylenes, and disilenes; photochemistry of organosilicon compounds, and spectroscopic studies of the interaction between Si–Si or Si–C σ bonds with aromatic π systems. He recognized an analogy between C–C double bonds and Si–Si single bonds, and found many new reactions of Si–Si bonds including those catalyzed by transition metal complexes [4]. Using ESR spectroscopy, he also studied the electronic structure of silyl and germyl



radicals, silyl-substituted π radicals, radical anions of aromatic compounds and ketones generated by electron transfer from trimethylsilyl anion in HMPA, and organosilicon radical cations in freon matrix. He also pioneered the photochemistry of $\sigma(\text{Si–Si})-\pi$ systems.



Regiospecific allylations of carbonyl compounds by using allylic silanes in the presence of Lewis acids (the Sakurai reactions) was discovered in 1976. During the following years, studies of allylations using allylic silanes developed extensively, and they are now regarded as being among the most important reactions in organic synthesis [5]. In 1986, metamorphosis of the chemistry of allylic silanes was achieved; pentacoordinate allylsilicates were found to allylate aldehydes without catalysts with extremely high regio- and diastereospecificity [6].

In 1987, Prof. Sakurai founded the Laboratory of Organosilicon Chemistry in Tohoku University of which he was the head until March this year. He has developed his field of research more and more in a variety of directions. The following are among the recent fruits of his labours: (1) synthesis and properties of unusual compounds such as octasilacubanes and hexasilaprismanes [7], highly distorted per(trialkylsilyl)-ethylenes and -benzenes and their dianions [8], paracyclophanes bridged by Si–Si bonds, and hexakis(fluorodimethylsilyl)benzene showing merry-go-round degenerate fluorine migration; (2) proposal of the OICT (orthogonal intramolecular charge-transfer) mechanism for the dual fluorescence of aryldisilanes [9]; (3) isolation, structure, and reaction mechanisms of organosilicon reactive in-

intermediates such as silaethenes, disilenes, and silylenes, and (4) discovery of anionic polymerization of masked disilenes giving polysilanes with high regioselectivity [10].

Prof. Sakurai has published more than 300 papers as the *Chemistry of Organosilicon Compounds* series. He has also made considerable contribution to the fields of organogermanium and organotin chemistry. Prof. Sakurai has been honored to receive the Matsunaga Award (1975), the Frederick Stanley Kipping Award in Organosilicon Chemistry from the American Chemical Society (1978), the Award of the Chemical Society of Japan (1981), and the Wacker Silicon Prize (1991). Recently, he received the Imperial Prize and the Japan Academy Prize (1994), the highest recognition of academic achievement in Japan, together with Prof. Makoto Kumada. Contributions to the progress of organosilicon chemistry by Prof. Sakurai are held in high esteem across the world.

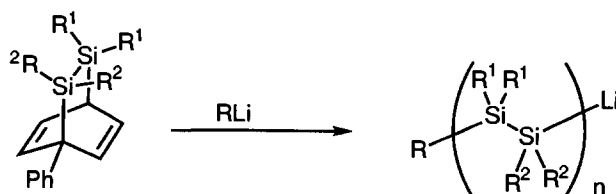
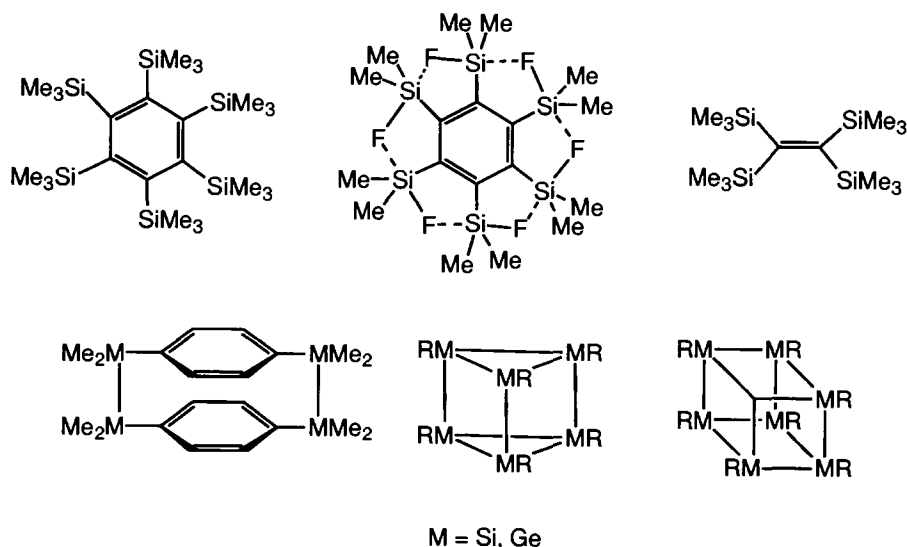
Prof. Sakurai is now the Editor-in-Chief of the *Bull. Chem. Soc. Japan* and has been a member of the editorial boards of many excellent journals: *Chemistry Letters* (Editor-in-Chief), *Chemical Reviews*, *Organometallics*, *Phosphorus Sulfur and Silicon*, *Journal of Organometallic Chemistry*, *Synthesis*, *Synlett*, *J. Phys. Org. Chem.*, *Chemistry - A European Journal*, and *Russian Chemical Bulletin*. He was a plenary or an

invited lecturer at many international symposia and even organized three very successful international symposia on organosilicon chemistry in Sendai.

Prof. Sakurai has also given full play to his ability for administration. He was active as the Dean of Faculty of Science at Tohoku University for three years from 1990. He is now the President of the Society of Organosilicon and Related Materials Chemistry as the founder, and the leader of the special research project of MITI, "Silicon-Based Polymers". He is expected to be the President of the Chemical Society of Japan in 1996.

The number of students who have graduated under the guidance of Prof. Sakurai has reached almost 200 during his 25 years at Tohoku University. They are very proud that he is a very amiable person at ordinary times, while a rather strict educator in chemical research. They have often been invited to his house and really enjoyed eating, drinking, chats and games together. They have always been attracted by a rich stock of topics based on his many hobbies and talents in fields other than chemistry: construction of audio systems and listening to music, photography, gardening, and wine.

Naturally, even after formal retirement from Tohoku University, Prof. Sakurai will never retire from his activity in science and indeed he will continue his work at the Science University of Tokyo. Former students, collaborators, and all the friends of Prof. Sakurai will



honor him and wish him much future happiness and satisfaction.

Mitsuo Kira
Tohoku University

References and notes

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