



## Kohei Tamao

Kohei Tamao received his B.S. (1965), and Master's (1967) degrees from Kyoto University (Dept. of Synthetic Chemistry, Faculty of Engineering). He completed his doctoral course in 1970 and was awarded a Doctor of

Engineering in 1971. After a postdoctoral position at the State Univ. of New York at Binghamton with J.J. Eisch, he joined Kyoto University as an Assistant Professor. He was promoted to Associate Professor in 1987 and then to Professor in 1993. In 2000, he was appointed Director of the Institute for Chemical Research at Kyoto University. This appointment was followed by an appointment as Director of the International Research Center for Elements Science. In 2005, he was awarded the title of Professor Emeritus at Kyoto University. He is the present Director of the RIKEN Frontier Research System. He has held Visiting Professor positions at both Nagoya University and Kyushu University. Professor Tamao has been the recipient of the Chemical Society of Japan Award for Young Chemists (1977), the Chemical Society of Japan Award (1999), the Frederic Stanley Kipping Award of the American Chemical Society (2002), the Toray Science & Technology Prize (2002), the Asahi Prize (Asahi News Paper Culture Foundation, 2003), the Medal of Honor with Purple Ribbon (2004), and the Japan Academy Prize (2007). He is also a Fellow of the Royal Society of Chemistry (1994-). Professor Tamao served as President of The Society of Silicone Chemistry, Japan (April 2004-March 2006), and Vice President of The Chemical Society of Japan (2005). He also served as Leader of the Center of Excellence (COE) Grant, entitled "Elements Science" from 2000 to 2004 which was supported by the Ministry of Education, Science, Sports and Culture, Japan. He is a member of Science Council of Japan (Oct. 2005-Sept. 2011) and the current Editor-in-Chief of the *Bull. Chem. Soc. Jpn.* His research interests include organometallic chemistry, synthetic organic chemistry, organosilicon chemistry, and main group materials science.

## 3M Lecturers:

- 1962 Sir Derek H.R. Barton, Imperial College
- 1963 Sir Ronald Nyholm, University College
- 1964 F. C. Tompkins, Imperial College
- 1965 S. Winstein, U.C.L.A.
- 1966 F. A. Cotton, M.I.T.
- 1967 J. O. Hirschfelder, Wisconsin
- 1968 A. Eschenmoser, E.T.H., Switzerland
- 1969 H. Taube, Stanford
- 1970 S.A. Rice, Chicago
- 1971 F.H. Westheimer, Harvard
- 1972 R.G. Pearson, Northwestern
- 1973 W.A. Klemperer, Harvard
- 1974 G. Stork, Columbia
- 1975 R. J. P. Williams, Oxford
- 1976 J. A. Morrison, McMaster
- 1977 D. Arigoni, E.T.H., Switzerland
- 1978 J. Chatt, Sussex
- 1979 J. A. Pople, Carnegie-Mellon
- 1980 W.P. Jencks, Brandeis
- 1981 J. Halpern, Chicago
- 1982 Sir John Meurig Thomas, Cambridge
- 1983 R. Breslow, Columbia
- 1984 M. L. H. Green, Oxford
- 1985 D. R. Hershbach, Harvard
- 1986 J. M. Lehn, Strasbourg
- 1987 M. H. Chisholm, Indiana
- 1988 R.A. Marcus, Cal. Tech.
- 1989 D.J. Cram, U.C.L.A.
- 1990 D. Seyferth, M.I.T.
- 1991 D. A. Shirley, Berkeley
- 1992 K. U. Ingold, NRC
- 1993 H. Schmidbauer, Munich
- 1994 A. J. Bard, U. Texas, Austin
- 1996 R. Huisgen, Munich
- 1998 Jean M. J. Frechet, Univ. of Calif., Berkeley
- 1999 Robert W. Field, M.I.T.
- 2000 Ian Dance, New South Wales
- 2001 K.C. Nicolaou, San Diego
- 2002 R.R. Birge, Connecticut/Syracuse
- 2003 D. Fenske, Univ. Karlsruhe, Germany
- 2005 A. Padwa, Emory University, Atlanta
- 2006 N. Dovichi, Washington State
- 2007 K. N. Raymond, Univ. of Calif., Berkeley
- 2008 K. Tamao, RIKEN and Kyoto Univ., Japan

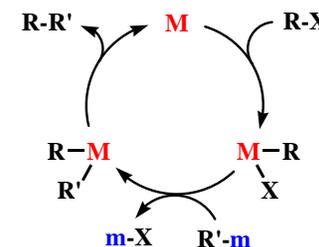
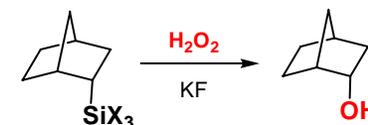


The UNIVERSITY of WESTERN ONTARIO

The 3M University Lecturer  
in Chemistry  
2008

KOHEI TAMAO

RIKEN Frontier Research System  
and Institute for Chemical Research  
Kyoto University  
Japan



**Prof. Tamao will present three lectures:**

**Tuesday, October 30th, 2007**

**4:00 p.m.**

**Auditorium B - University Hospital**

**3<sup>rd</sup> floor**

**(off connecting hallway to Dental Sciences)**

**Lecture #1 - Organosilicon Chemistry  
Directed Toward Organic Synthesis**

The most characteristic feature of silicon is an ability to form penta- and hexa-coordinate (hyper-coordinate) compounds as stable species, in contrast to carbon. We have introduced a concept to modern synthetic organic chemistry that silicon-carbon bonds are activated toward electrophiles through the formation of hypercoordinate species, and have developed some new reactions based on this concept from a synthetic point of view. This lecture will include the following topics:

1. Comparison of silicon with carbon and a brief historical survey of organosilicon chemistry
2. Silicon-carbon bond cleavage reactions of hexacoordinate organopentafluorosilicates
3. Hydrogen peroxide oxidation of the silicon-carbon bond in ordinary tetracoordinate silicon compounds to form alcohols: Development, mechanism and application to regio- and stereo-selective polyol synthesis
4. Functionalized silyl anions: from stable aminosilyl-lithiums to silylenoids and sila-ylides

**Contact**

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**Wednesday, October 31st, 2007**

**4:00 p.m.**

**3M Building - Room 3250  
(adjacent to Somerville House)**

**Lecture #2 - Elemento-Organic Chemistry  
Toward Materials Science**

While elemento-organic compounds, i.e., organic compounds containing heavy main group elements, have widely been used as synthetic reagents, they have scarcely been used as functional materials, especially electronic materials, except for a broad range of silicone industrial products and conductive polythiophenes. We have been interested in the photophysical properties of certain elemento-organic compounds from both viewpoints of basic science and practical application. This lecture will include the following topics:

1. Silole-containing pi-conjugated systems: Synthesis, electronic properties and application as an efficient electron-transport material for electroluminescent devices.
2. Photophysical property control based on the coordination number change of trianthryl-boron, silicon and phosphorus compounds: colorimetric sensing of a fluoride ion
3. Sigma-conjugated oligosilanes: Conformation dependence of the photophysical properties

**Coffee and Donuts will be served  
15 minutes prior to the talks outside the  
lecture room.**

**Thursday, November 1st, 2007**

**4:00 p.m.**

**3M Building - Room 3250  
(adjacent to Somerville House)**

**Lecture #3 - Transition Metal Catalyzed  
Cross-Coupling Reactions: Discovery of the  
Nickel-Phosphine-Catalyzed Cross-  
Coupling Reaction and Some Recent  
Advancements**

The nickel-catalyzed cross-coupling reaction between C(sp<sup>2</sup>)-halides and Grignard reagents, reported in 1972 independently by R. Corriu's group in France and by our group in Japan, has some advantages over the widely used palladium-catalyzed cross-coupling reactions. The most characteristic feature is that aryl chlorides and even aryl fluorides can be used as the coupling partners.

In this lecture, I will present a story of discovery of the Ni-phosphine catalyzed cross-coupling reaction in our group in 1972 and some recent advancements which include:

1. Ni- and Pd-catalyzed cross-coupling reaction of polyfluoro-arenes
2. Pd-catalyzed cross-coupling of aryl-triazenes with arylboronic acids or aryl-trifluorosilanes
3. The common key role of a Lewis acid to activate the strong Aryl-F and Aryl-N bond in these cross-coupling reactions.

Our website: <http://www.uwo.ca/chem/>