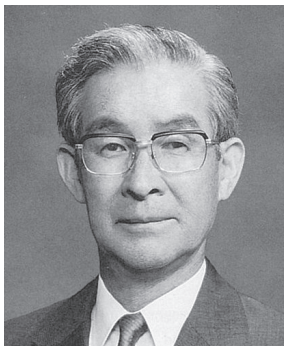
Obituary



Professor Emeritus
Dr. TAKENAKA, Tohru (1929–2014)

Dr. Tohru Takenaka, Professor Emeritus of Kyoto University, passed away unexpectedly on July 26, 2014, in Kyoto, at the age of 85.

Dr. Tohru Takenaka was born in Tsuyama, Okayama on July 20, 1929. After graduating from Department of Physics, Hiroshima-Bunrika University (present Hiroshima University) in 1952, he immediately became a student of Department of Physics, Graduate School of Science, Kyoto University. He was soon employed as an Assistant Professor in a laboratory under the direction of Professor Renpei Goto in Institute for Chemical Research, Kyoto University in May, 1953. He received his doctoral degree of science from Kyoto University in 1962 for the study on "Inductive Effect of Substituent Groups on the Symmetrical Deformation of Methyl Groups." Dr. Takenaka was promoted to be an Associate Professor of Laboratory of Colloid Chemistry, Institute for Chemical Research, Kyoto University in February, 1967, and he was promoted to be a Full Professor of the same laboratory in April, 1971. After the reorganization of the institute in 1992, he led the laboratory with a new name of 'Laboratory of Chemical Interface I' as a Full Professor. Dr. Takenaka retired from Kyoto University in March, 1993, and he was honored with the title of Professor Emeritus, Kyoto University on April 1, 1993.

After the retirement of Kyoto University, he was immediately invited by Okayama University of Science to be a Professor of Department of Science, and he continued chemical education of about quantum chemistry for eight years. After that, he went to the university from his home in Kyoto every week to have some chemistry classes as a part-time lecturer for additional five years. In 2006, he was invited by Northeast Normal University, China, as a guest Professor. In this manner, he was long engaged in enthusiastic chemistry education.

Dr. Takenaka is globally recognized to be a pioneer of vibrational spectroscopist on surface and interface chemistry. When he was employed as an Assistant Professor, very few research groups are available in Japan for infrared (IR) and Raman spectroscopy, and he was involved in fundamental researches of theory and instrumentation with his good colleagues in 1950's. After receiving his doctoral degree, his research interest was gradually oriented to surface chemistry involving ultrathin films. One of the early successes of his surface chemistry using Raman spectroscopy is a study of a Langmuir monolayer at the air/water interface with an optical geometry of the total reflection. This experimental approach has become a standard technique in this field in nowadays. He was also interested in Fourier transform (FT) IR spectrometer in early days, and he introduced it with some different optical accessories to reveal the molecular structure in Langmuir-Blodgett (LB) films on a solid substrate.

In addition, Dr. Takenaka was also interested in high-sensitivity techniques applicable to IR and Raman spectrometries. In particular, surface-enhanced Raman scattering (SERS) was an important topic in 1980's. He readily used the LB technique to discriminate the charge-transfer and plasmon resonance effects on the SERS phenomena, which had an impact on the research field being still active.

With a progress of the FT-IR technology, the optical geometry of external-reflection for analysis of an LB film deposited on a dielectric substrate was a new target of his study. To quantitatively reveal the surface selection rule of this technique, the analytical theory on electrodynamics was studied, with which the molecular orientation in a thin film was readily revealed with a good analytical quality.

During his career, he played a role of Chair of Division of Colloid and Interface Chemistry, Chemical Society of Japan from 1997 for two years. He had not only Japanese colleagues, but also many international colleagues, and he was actively involved in international scientific activities through his life.

Obituary

Professor Emeritus
Dr. INOUYE, Yuzo (1920–2014)

Dr. Yuzo Inouye, Professor Emeritus of Kyoto University, passed away on November 1, 2014, in Kamakura. Dr. Yuzo Inouye was born in Tottori on March 25, 1920. He graduated from the Department of Agricultural Chemistry, Collage of Agriculture, Kyoto Imperial University in 1946 and continued his research on pyrethrum chemistry as a graduate student at the Department of Agricultural Chemistry, Faculty of Agriculture, Kyoto University under the supervision of Professor Sankiti Takei. After graduation, he became an Assistant Professor of the Department in 1951 and started his academic career, majoring in chemistry of plant products and pesticides. In 1957, he joined the member of the Institute for Chemical Research, Kyoto University. He received a doctoral degree (D. Agr.) from Kyoto University in 1958 for his studies on synthetic pyrethroids under the supervision of Professor Takei. In 1962, Dr. Inouye was promoted to an Associate Professor of the Institute for Chemical Research, Kyoto University. Immediately, on leave from university, he stayed at Florida State University, USA as a visiting professor and worked on asymmetric reactions in co-operation with Professor H. M. Walborsky. In 1973, Dr. Inouye was promoted to a Full Professor of Kyoto University to hold a chair of Laboratory of Plant Products Chemistry, the Institute for Chemical Research, Kyoto University. He retired from Kyoto University on April 1, 1983 and was honored with the title of Professor Emeritus, Kyoto University on that day.

Dr. Inouye performed extensive studies in natural product chemistry, organic stereochemistry and bioorganic chemistry. In particular, he pursued extensive studies as a pioneer in asymmetric synthesis and the biological activities of pyrethrins, an insecticidal principal of Dalmatian pyrethrum, *Tanacetum cinerariifolium*, from a stereochemical point of view. He succeeded in the structural identification of the second chrysanthemic acid (pyrethric acid) and in determining the absolute stereochemistry of pyrethrolones by their total synthesis. His extensive structure-activity relationship studies successfully identified the comprehensive stereochemical requirements of pyrethrins for insecticidal activities. His studies formulated the chemical basis of synthetic pyrethroids that has triggered the revolutionary development of the subsequent synthetic insecticides industry in Japan. For these accomplishments, Dr. Inouye received Agricultural Chemistry Award from the Japan Society for Bioscience, Biotechnology, and Agrochemistry in April, 1959.

Dr. Inouye was also interested in the development of novel methodology and the theoretical background of asymmetric reactions. He pursued extensive studies on the carbanion and carbenoid chemistry for asymmetric cyclopropanation and formulated the dependence of the stereochemical outcome on the solvent polarity. His theoretical consideration of solvent polarity in asymmetric reactions made an epoch to the development of this field. For his excellent achievements, the Prize from Petroleum Research Fund administrated by the American Chemical Society was awarded to him. Dr. Inouye is the first Japanese winner of this award. His research interests also covered the asymmetric reactions with enamines, sigmatropic rearrangement and the stereochemical control of the addition of Grignard reagents. His outstanding academic expertise in asymmetric synthesis came to fruition with his authored book "Asymmetric Organic Synthesis – Comprehensive Interpretation Thereof" (Kagaku Dojin, 1977, ISBN 9784759800463) and his other translated books.

Dr. Inouye's research interest was further extended to enzyme model reactions that mimic asymmetric reduction of ketones by alcohol dehydrogenases. He succeeded in developing novel chiral NADH model compounds that rivaled alcohol dehydrogenases in stereoselectivity and chemical yield.

Dr. Inouye's superiority as a teacher as well as a researcher, deep insight into science and warm hospitality have attracted and stimulated many young and talented students, and have won him the respect and admiration of many friends and colleagues from all over the world. He also served as an executive board of scientific societies such as the Japan Society for Bioscience, Biotechnology, and Agrochemistry.

For his outstanding professional activities in research and education, he received the Third Order of Merit with the Order of the Sacred Treasure from the Japanese government in April, 1994.

Obituary

Professor

Dr. YOKO, Toshinobu (1949–2014)

Dr. Toshinobu Yoko, Professor of Kyoto University, passed away on 25, Feb, 2014 in Kyoto.

Dr. Toshinobu Yoko was born in Hokkaido on 4, November, 1949. He graduated from the Department of Metallurgy, Tohoku University, with the degree of B. Eng. in 1972 and from the graduate course at the same university with the degree of M. Eng. in 1975. In 1979 he received Dr. Eng. from Tohoku University for a thesis entitled "Viscoelastic Behavior of $ZnCl_2$ - MCl (M = Li, Na, K, Cs) Binary Melts".

He worked as a postdoctoral fellow at Rensselaer Polytechnic Institute (Troy, New York, USA) for two years from 1979 to 1981. He got an academic position of research associate at the Department of Industrial Chemistry, Mie University, in 1981. In 1984 he was promoted to Associate professor at the same university. In 1988 he moved to Institute for Chemical Research, Kyoto University and was promoted to a Full Professor there in 1994.

The achievements made by him were mainly concerned with the preparation and the structure- and property-characterization of a variety of functional glasses and sol-gel derived coating thin films. His research was composed of five fields such as (1) structure and properties of glasses, (2) nonlinear optical properties of inorganic glasses and sol-gel derived films, (3) preparation of functional materials by sol-gel method, (4) photoelectrochemistry of sol-gel derived semiconducting oxide films, and (5) high temperature molten salt chemistry. In 1993 he received the Scientific Award of the Ceramic Society of Japan for "Preparation and characterization of functional ceramic coatings by sol-gel process".

He analyzed the glass structure by using X-ray diffraction, neutron diffraction and solid state NMR. He found that the local structure of alkalis in glasses is not homogeneous but heterogeneous. This is because each alkali has the different electrical field; a cation with high field strength was likely to aggregate in mixed silicate glasses. This type of structural inhomogeneity generated site mismatch energy, which was found to be responsible for the mixed alkali effect.

He also proposed the highest quantum efficiency for amorphous phosphate glass. It is notable that the broad emission is brought about by Sn^{2+} center, and that the UV-excited emission efficiency is the largest efficiency of glass material without rare earth (RE) cation ever reported. He has also demonstrated white light emission of RE-free Mn-doped phosphate glass. The transparent glass showed blue ~ white ~ red emission, which depended on the amount of MnO. Because the high value of quantum efficiency is comparable to crystalline phosphor, it suggests that RE-free glass phosphor is very fascinating material from the viewpoint of unique emission mechanisms in a random matrix.

He was also interested in organic-inorganic hybrid materials. He proposed new synthetic method under a solventless, catalyst-free, low-temperature, one-pot condition by metathesis. This reaction provided crack-free monolithic materials easily because of no solvent evaporation. The hybrid material shows low-melting property, as melting temperatures ranged from 50 to 110 °C where the organic dyes do not degrade. The durability of these hybrids was also high, indicating that these materials can be used as highly durable low-melting hybrids for optical host application.

Dr. Yoko's superiority as a teacher, insight into science, and warm hospitality not only have attracted and stimulated many young and talented students but also have won the respect and admiration of many friends and colleagues. Among his numerous professional activities, he has served as executive boards of scientific societies such as Ceramic Society of Japan.