Retirement

Professor OZAWA, Fumiyuki
International Research Center for Elements Science
– Organometallic Chemistry –

On 31 March 2019, Dr. OZAWA, Fumiyuki retired from Institute for Chemical Research (ICR), Kyoto University after about 16 years of service and was honored with the title of Professor Emeritus of Kyoto University.

Dr. Ozawa was born in Niigata Prefecture in March 1954. He graduated from Faculty of Engineering, Tokyo Metropolitan University in 1976, and went on to the graduate school at Tokyo Institute of Technology to study organometallic chemistry under the direction of the late Professor Akio Yamamoto. He was employed as Assistant Professor at Research Laboratory of Resources Utilization, Tokyo Institute of Technology in 1980, and granted the degree of Doctor of Engineering in 1984. He spent the year 1987–1988 as Visiting Associate at California Institute of Technology. In 1989, he was appointed as Associate Professor at Catalysis Research Center, Hokkaido University. He moved to Faculty of Engineering, Osaka City University in 1994, and was promoted to Professor in 1995. In 2003, he moved to International Research Center for Elements Science, which was newly established in ICR the same year. He served as the head of this center in 2009–2011 and 2015–2017. He also greatly contributed to the establishment of a series of MEXT inter-university research projects since 2005.

Throughout his academic career, Dr. Ozawa devoted himself to fundamental research on organometallic chemistry. He elucidated the mechanisms of various organometallic reactions relevant to catalytic transformations. In particular, the studies on organopalladium complexes established the basic concept of configurational constraints on organometallic reactions. He discovered the palladium-catalyzed double carbonylation. He also developed a rational design method of reactive organopalladium complexes for alkene insertion and applied it to the catalytic asymmetric Heck reaction. The insertion chemistry was extended to silyl and related complexes and applied to catalysis.

Since the late 1990's, he started the chemistry of phosphaalkene complexes, taking advantage of the research project on the Chemistry of Inter-Element Linkage. Phosphaalkenes with P=C double bonds have been prepared since the late 1970's, but they have been scarcely utilized in organometallic chemistry. He revealed remarkable reactivities of phosphaalkene complexes and demonstrated the great potential in organometallic chemistry. For example, phosphaalkene palladium complexes efficiently catalyze dehydrative condensation of active methylene compounds or anilines with allylic alcohols under mild conditions. The palladium-catalyzed allylation was known as the Tsuji-Trost reaction but required the pre-activation of allylic alcohols by conversion into allylic esters. The phosphaalkene complexes allowed eliminating the pre-activation step. This finding provided the opportunity to open up many simple catalytic allylation protocols using allylic alcohols. He also showed that phosphaalkene ligands allow isolation of transition metal complexes with unusual structures. For example, a PNP-pincer type phosphaalkene ligand forms platinum(0) complexes with a square planar configuration, the coordination geometry of which is very uncommon for formal d^{10} complexes.

His research activities also included polymer synthesis. He studied catalytic methods of synthesizing functional polymers via olefin metathesis and cross-coupling reactions. The latest example is the palladium-catalyzed direct allylation polymerization (DArP), which produces π-conjugated polymers (conductive polymers) used in optoelectronic devices. Such polymers have so far been prepared by catalytic cross-coupling polymerization using organometallic monomers, but he documented for the first time that the same polymers could be synthesized more easily by direct arylation using C-H bond activation. He developed mixed ligand catalysts for DArP and realized the precise synthesis of highly head-to-tail regioregular poly(3-hexylthiophene) and donor-acceptor type alternating copolymers with well-controlled structures.

His educational contribution to Kyoto University is also noteworthy. He has guided 34 graduate students and 28 undergraduates and sent them out to industry and academia. He also accepted many foreign postdocs and students. He has been an active member of domestic and international academic societies. In particular, he made a great contribution to organometallic chemistry as the Chair of Division of Organometallic Chemistry, Kinki Chemical Society.

Dr. Ozawa's contribution to Kyoto University and the Institute through his scientific, educational and administrative activities is hereby gratefully acknowledged.