

Introduction



Between 1956–1965, Professor Akira Nakamura and I worked together in the same laboratory of Osaka University under the supervision of Professor Nobue Hagihara. It was the time of the dawn of Organometallic Chemistry. Since then, we have enjoyed fruitful organometallic chemistry for more than 40 years. Time flies so quickly and he has now reached the Japanese retirement age. I write with dear memory an introduction to this special issue of *Journal of Organometallic Chemistry* which is dedicated to honour Professor Akira Nakamura.

Professor Akira Nakamura was born in 1934 in a suburban area of Osaka, Japan. His early education was heavily hampered by the World War II and he received only a casual science education during his high school days. After his entrance into Osaka University, the Japanese economy recovered somewhat to allow the study of modern chemistry to some extent. His studies in organometallic chemistry had just begun when he joined Professor S. Murahashi's group in the Institute of Scientific and Industrial Research, Osaka University in 1956. Under the guidance of Professor N. Hagihara,

he began high pressure experiments with acetylene. Metal carbonyls were the only organometallic compounds then available, but metallocenes were introduced just at that time. In 1962, he obtained a doctoral degree with his study on diene-complexes of transition metals, and then he went abroad to study further at the Research Division, New York University under the direction of Dr Minoru Tsutsui for the period 1962–1963. After returning to Japan, he was promoted to Associate Professor of the newly established Faculty of Engineering Science, Osaka University in 1965. Then, with the cooperation of Professor Sei Otsuka, he studied various types of homogeneous catalysis with reactive organometallic complexes. In 1977, he had been promoted to a Full Professor at the Department of Macromolecular Science, Faculty of Science, Osaka University. In the period 1993–1995 he was Director of the Coordination Chemistry Laboratory at the Institute for Molecular Science at Okazaki.

He has made substantial progress in the conjugated diene complexes of transition metals. In 1959, he and Professor Hagihara reported a remarkable example of fluxional properties for the tricarbonyliron complex of cyclooctatetraene, the structure of which remained unknown until the X-ray work of J.D.Lipscomb in 1965. The unique conjugation of the double bonds in this complex were thought to be the origin of this property. Further research on the various related complexes lead him and Professor Hagihara to the first cyclobutadiene complex of cobalt, $\text{CpCo}(\text{Ph}_4\text{C}_4)$ in 1961. Interest in the polyene complexes of later transition metals prompted him to prepare a variety of allene and cumulene complexes of iron, rhodium, platinum and palladium in the 1960s. Selective homogeneous catalysis utilizing some of these new complexes was the major area of research in 1970–1976 and he and Professor Otsuka found novel oxygenation of isocyanide through the catalysis of bis-(isocyanide)dioxygennickel. Highly enantioselective cyclopropanation of conjugated olefins with diazoacetate was found by the catalysis of cobalt(II) complexes of *d*-camphorquinonedioximate ligands. In the period of 1978–1988, he had cooperated with Professor H. Yasuda in the chemistry of early transition metal 1,3-diene complexes mostly with zirconocene diene complexes.

Among many important discoveries in this area of organometallic chemistry, rigorous characterization of *s-trans* diene coordination by X-ray and by NMR spectra contributed very much to the present day understanding of these reactive complexes. Further research on the catalysis of Cp(diene)metal species with $M = Nb, Ta$, lead to the finding of an ethylene living polymerization catalyst in 1992. The area of modified Ziegler–Natta catalysts was thus extended to heavy Group 5 metals for the first time. The bonding of 1,3-diene to these Group 5 metals is now found to be comparable to Cp in these cases.

To date, Professor Nakamura has published more than 300 papers and 80 reviews. For his contributions to chemistry, he received the Osaka Science Award in

1983, and Japan Chemical Society Award in 1994. He has also played an active role as the Regional Editor of *Journal of Organometallic Chemistry*. We appreciate his great contribution to the development of organometallic chemistry. After retirement, he will be a guest professor of Toho University. We wish you, Professor Nakamura, to enjoy good health and organometallic chemistry for many more years to come.

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