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31. Yoshio Iwakura

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Personalities in Polymer Science



Yoshio Iwakura

Yoshio Iwakura was one of the leading personalities in polymer science of the 1970's in Japan. His scientific work on high temperature polymers had a fundamental impact on the development of this field, but his other contributions also played a major role for the development of polymer science in Japan. His service to the professional polymer community was also exemplary.

Yoshio Iwakura was born on March 31, 1914 in Shibukawa City as the son of Ibisaku and Ishi Iwakura. Yoshio grew up in Maebashi City where he attended Elementary School from 1920 and then Middle and Higher Technical School graduating in 1933. For about one year he carried out experimental work on oil chemistry under the direction of Professor S. Ueno of Osaka University.

In 1936 Yoshio Iwakura enrolled in the Tokyo Institute of Technology and received his Bachelor of Engineering degree in 1939. In the same year he was appointed Lecturer (Jo-Shu) in the *kaza* of Professor Toshio Hoshino. During the next few years Yoshio Iwakura pursued his studies toward a higher degree while teaching in the Hoshino *kaza*. He received his doctoral degree of Engineering in August 1948 from Tokyo Institute of Technology.

In 1948, Iwakura was appointed Associate Professor (Jo-Kyoju) in the Research Laboratory of Resources Utilization at the Tokyo Institute of Technology and in

1955 he became Professor, a position he held until 1964. In 1960 Yoshio Iwakura was invited to join The University of Tokyo, and until 1974 he held the position of Professor at the Faculty of Engineering.

After his mandatory retirement from The University of Tokyo in 1974, Iwakura joined Seikei University as Professor in the Faculty of Engineering, and remained there until 1982. In 1982, he became Emeritus Professor at Seikei University, and, in 1987 he was awarded the position of Professor Emeritus at the The University of Tokyo.

Yoshio Iwakura was a very respected teacher and, consequently, he was in high demand as a Guest Professor: from 1955-1960 he was associated with Rikkyo University, from 1955-1960 he was also associated with the Tokyo Metropolitan University, from 1957-1960 with Gakushuin University, from 1960-1963 with Yamanashi University, from 1963-1974 with Gunma University, in 1969 with Shinshu University, from 1971-1975 with the Tokyo University of Agriculture and Technology and, finally, in 1973 with Osaka University.

Yoshio Iwakura's activities had a substantial impact on the functioning of professional societies in Japan in the 1970's. From 1973 to 1975 he was President of the Society of Synthetic Organic Chemistry Japan, from 1971 to 1973 he was Vice President of the Chemical Society of Japan and from 1974 to 1976 he served as President of the Society of Polymer Science, Japan. It was during his presidency that the agreement of cooperation between the Society and the Chairman of the Division of Polymer Chemistry of the American Chemical Society, Otto Vogl, was signed, an agreement that lasted for over a decade until it was replaced with the creation of the Pacific Polymer Federation.

Iwakura was also active in international affairs, in IUPAC. From 1967 to 1971 he was the National Representative of Japan in the Macromolecular Division and from 1971 to 1975 he was Titular Member of the Macromolecular Division.

In national affairs in Japan, Iwakura was a Professional Member at the Ministry of Education from 1973 to 1979 and from 1975 to 1987, at the Ministry of International Trade and Industry from 1974 to 1984 and The Science and Technology Agency from 1979 to 1994.

More recently Yoshio Iwakura was invited to act as a Director at various

Foundations: The Foundation "Hattori Hokokai" since 1985, the Yoshida Foundation for Science and Technology since 1995 and the Kurata Foundation since 1994.

For his many services and accomplishments, Yoshio Iwakura received a number of awards: The Third Order of Merit with Medium Cordon of the Rising Sun in 1987, and the Award of the Chemical Society of Japan in 1967. In 1976 Iwakura was elected Honorary Member of Society of Polymer Science, Japan.

Yoshio Iwakura's research interests include:

- 1) Polyaddition Reaction; Syntheses of Polyurethanes, Polyureas, Polythiourethanes, Polythioureas, Polyamides and Polyguanidines by polyaddition reactions of two functional compounds (i.e. diisocyanate, diisothiocyanate, diketene and biscarbodiimide).
- 2) Ring Opening Polyaddition Reactions using Bis-Epoxy Compounds with Bis-N,N-ethylene Ureas or Bis-N,N-ethylene Urethanes.
- 3) Polycondensation-Addition Reactions using Isoocyanato-Carboxylic Acid Chlorides, *o*-Isoocyanatoalkyl Chloroformates, or Isoocyanatobenzene Sulfonyl Chlorides.
- 4) New Synthetic Methods for the Preparation of 2-Oxazolones by reacting Glycidyl Ethers with Urethanes, Ureas, or Acid Amides.
- 5) Reactive Polymers: a.) Use of 1-Alkyl Isoocyanates, b.) Preparation of Reactive Fibers from Copolymers of Acrylonitrile with Glycidyl Methacrylate(GMA), c.) Grafting of GMA onto Polypropylene Fiber, d.) A Novel Preparation of 2-Alkylidene-3-oxazolin-5-ones (New Pseudoxazolones), e.) Reactions of Alkylidene Pseudoxazolones.
- 6) High Temperature Resistant Polymers; a.) Syntheses of Polybenzimidazoles, Poly-1,3,4-oxadiazoles, Polybenzoxazoles, Polybenzothiazoles and similar polymers by Solution Polycondensation Reactions Using Polyphosphoric Acid(PPA) or Oleum, b.) Synthesis of Poly(p-phenylene-1,2,4-oxadiazole) from p-Cyanobenzonitrile Oxide by a Solid State Cycloaddition Polymerization, c.) Polymerization Reactions Using 1,3-Dipolar Cycloaddition Reactions.
- 7) Syntheses of Linear Oligomers; a.) Oligourethanes, b.) Syntheses and

Columns

Conformational Aspects of Optically Active Oligourethanes, c.) Syntheses of Oligoesters, d.) A Novel Synthesis of Block Oligopeptide and e.) Step-wise Syntheses of Oligopeptides using NCA.

- 8) Studies on Chitin: Preparation of Water Soluble Chitin.

Iwakura's extensive scientific activities have been presented in many publications; he is the author and co-author of about 380 articles, including about 350 scientific papers and 10 patents. He was also the author or co-author of 20 books and several book chapters.

In addition to his scientific interests, Yoshio Iwakura also has a few hobbies. As a young man, he was a dedicated baseball player and also played golf when possible. He still is interested in sports and watches it on television. He also enjoys listening to classical music. Yoshio Iwakura is also interested in Japanese poetry especially the Japanese verses "*tanka*". He loves nature and country life and every summer he spends some time in his favorite place located at the base of Mt. Haruna.

In 1940 Yoshio Iwakura married the former Hama Ohshima. They have four children and seven grandchildren.

This article was prepared by **Otto Vogl***, Monbusho Professor, Kyoto Institute of Technology, Matsugasaki, Sakyo-ku, Kyoto 606, Japan, and **Sei-ichi Nukahama**, Department of Polymer Chemistry, Tokyo Institute of Technology, Ookayama, Meguro-ku, Tokyo 152, Japan.
