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# 1. Yukio Imanishi

Otto Vogl

*University of Massachusetts - Amherst*, [vogl@polysci.umass.edu](mailto:vogl@polysci.umass.edu)

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## Personalities in Polymer Science



Yukio Imanishi

Professor Imanishi is one of the leading polymer scientists of Japan at the turn of the 20th century. He ingeniously combined synthetic polymer science with natural polymers, especially proteins, and was a pioneer in trying to understand the interaction of cells with polymers. He also contributed significantly to the interaction of Japanese polymer scientists with the international community and occupied, for years, leading positions in the Society of Polymer Science, Japan (SPSJ).

Yukio Imanishi was born in Kyoto, Japan on September 19, 1934 as the son of Shojiro and Yoshiko Imanishi. He had a brother and a sister.

Soon after his birth, the family moved to Taipei, Taiwan, where his father was a Professor of Economy and Commerce of Taiboku Imperial University, now Taiwan University. Yukio grew up and lived in Taiwan until the end of World War II. After returning to Osaka, he went to Secondary School and High School and graduated in 1953.

In 1953, Imanishi enrolled at Kyoto University and studied in the Department of Textile Chemistry, Faculty of Engineering.

He received his B.S. in 1957 and continued his work toward his masters degree at the Division of Textile Chemistry. His advisor was Professor Seizo Okamura and his thesis was entitled *Cationic Polymerization of  $\beta$ -Methylstyrene* (in Japanese); he received his degree in 1959. In 1961, the Department of Textile Chemistry was reorganized and named Department of Polymer Chemistry. Yukio Imanishi continued to study for his Ph.D. with Professor Okamura and produced a thesis entitled *Chain Transfer Reactions in Cationic Polymerization*. He obtained his doctoral degree in engineering from Kyoto University in 1965.

In 1961 Imanishi was appointed Instructor (Jo-shu) in the Department of Polymer Chemistry, Faculty of Engineering, Kyoto University; in 1971, he became Associate Professor (Jo-kyoju), and in 1978, Professor (Kyoju). For one year, from October 1985 to September 1986, he also served as a Professor at the Research Center of Medical Polymers and Biomaterials, Kyoto University. Imanishi's position changed in 1993, when he became Professor of Polymer Materials Chemistry, Division of Material Chemistry, Graduate School of Engineering, Kyoto University. He became Professor Emeritus in 1997.

In 1996, Imanishi joined the Nara Institute of Science and Technology (NAIST) as a Professor of Polymer Materials Science and as the Dean of the Graduate School of Materials Science.

During his career, Imanishi has been a devoted teacher and lecturer and served at a number of institutions as visiting professor. He has had appointments at Hokkaido University (1980), Nagoya University (1983), Osaka University (1984), Nagasaki University (1987), Nagasaki University of Technology (1988), Kyushu Institute of Technology (1989), Osaka Prefecture University, University of Tokyo, Shizuoka University (1990), Nara Women's University and Faculty of Pharmacy of Kyoto University (1991), and Fukui University (1994). He has also lectured at Kyoto Sangyo University since 1991.

Imanishi worked as an editor, as a member of editorial boards, and as a member of the international advisory board of a number of international journals of polymer science and technology. Since 1980, he has functioned as Asian Editor of the journal *Polymer*.

Yukio Imanishi has been involved in the organization of several international conferences and symposia. In 1988, he was the chairman of the Local Committee of the IUPAC 32nd International Symposium on Macromolecules in Kyoto. He organized the Taniguchi Conference in Otsu twice, in 1990 and 1994. He was active in the organization of the Kyoto/Siena Symposium in Kyoto in 1993 and 1997, the International Polymer Conference (IPC-6) in Nagano in 1997, and the International Symposium on Nano-Biotechnology for Future Devices in Nara in 1998.

In December 1964, Imanishi went to the U.K. to work with Professor C. H. Bamford at the University of Liverpool. He was assigned to work on the synthesis of poly( $\alpha$ -amino acids) by anionic polymerization. His interest in the combination of synthetic polymers and polypeptides originated at that time. After returning to Kyoto in April 1966, Imanishi became very interested in polymerizations initiated by polymeric initiators as enzyme-model reactions. He later extended his work to include biomimetic polymer reactions and biospecific polymer reactions.

Over the years, Imanishi made significant scientific contributions to a number of areas of polymer science, including the low-temperature cationic polymerization of vinyl compounds and cyclic dienes, anionic polymerization by hydrogen migration, olefin polymerization with transition-metal complex initiators, and polymerization of amino acid by NCAs. He was also interested in the chemistry of hydrolytic enzyme model polymers, intramolecular reactions proceeding on a polymer chain, interaction of linear or cyclic peptides with small molecules, structure as well as functionalities of polypeptides, photofunctional polymer assembly,

and intelligent molecular devices. His work on the chemistry of biorelated polymers included design and synthesis of biocompatible polymers, biomembrane-active peptides and cancer promoters, control of cell functions with bihybrid membranes, protein mutation by biological and nonbiological methods, supramolecular assembly of proteins and peptides, and *in vitro* selection.

Through these research activities, Imanishi achieved numerous significant results in the field of bio-related polymers, including the synthesis of artificial proteins by chemical methods, protein engineering, and the development of cell engineering.

Imanishi has published his work in numerous publications. He is the author of about 370 scientific papers, 175 review articles, and over 60 monographs.

Over the years, Yukio Imanishi received a number of awards. In 1975 he received the Award of the Society of Polymer Science, Japan (SPSJ), and in 1999, the Award of Distinguished Service for the Advancement of Polymer Science by SPSJ. In 2001 he was elected an Honorary Member of SPSJ.

In 1997 Imanishi received an Honorary Doctoral Degree from the University of Siena, Italy. In 1987, he received the title of Visiting Professor from South China Normal University, People's Republic of China (PRC) and in 1994, from Nankai University, PRC.

Yukio Imanishi was, in various functions, extensively involved in SPSJ. From 1986 to 1996 he was a Director of the society, from 1990 to 1994, Vice President, and from 1994 to 1996 he was the President of SPSJ.

Throughout his life, Yukio Imanishi loved traveling to historical places and picturesque areas, especially scenic mountain areas. Reading, in particular, mystery stories and Chinese history, is one of his favorite hobbies. His interests also include sports, watching and playing baseball, and oriental (Chinese, Japanese, and Korean) cuisines.

In 1961, Yukio Imanishi married the former Yoshiko Nakagiri of Kyoto. They have a son, Nobuyuki, and two daughters, Harae and Akiyo. Yoshiko passed away in June 2000 after 40 years of a very happy marriage.

This article was prepared by **Otto Vogl**, Herman F. Mark Professor Emeritus, Department of Polymer Science and Engineering, University of Massachusetts, Amherst, MA 01003-4350, USA

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Volume 1, Number 1, 1997

Volume 1, Number 1, 1997

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