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## 33. Noburo Yamazaki

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## Personalities in Polymer Science



Noboru Yamazaki

### Honoring Professor Noboru Yamazaki on his 77th Birthday\* [Kijyu]

Noboru Yamazaki began his career as a rubber chemist but subsequently made significant contributions to condensation polymerization. He also played major roles in the activities of the Society of Polymer Science, Japan, the Society of Rubber Industry, Japan and international relations of polymer science and polymer science oriented organizations in general.

Noboru Yamazaki was born on March 31, 1921 in Tokyo, Japan as the youngest son of Jingoro and Taka Yamazaki. He had three brothers and two sisters. Noboru's father, Jingoro Yamazaki, was an electrical engineer who worked at the National Institute of Industrial Chemistry on the electrolysis of molten aluminum salts. He died when Noboru was 6 years old but the basic ideas of electrolysis remained with Noboru and were the basis of his first independent work. Noboru grew up in Aoyama, a south-west residential section of Tokyo. He went to Elementary School, Middle School and High School in Shizuoka, near Mount Fuji and graduated in 1942.

Noboru Yamazaki enrolled at the Tokyo Institute of Technology in 1942 and received his Bachelor Degree in

Engineering from there in 1945. Shortly thereafter, in 1946, he was appointed Lecturer (*Jo-Shu*) at the Faculty of Engineering, Department of Chemical Engineering at the Tokyo Institute of Technology. During this time he studied for his doctoral degree under the direction of Professor Shu Kambara and, in 1961, received his degree of Doctor of Engineering at the Tokyo Institute of Technology with a thesis entitled "Study of Synthetic Isoprene Rubber with Organo-Metallic Catalysts".

In 1965, Noboru Yamazaki was promoted to Associate Professor (*Jo-Kyoju*) at the Department of Polymer Chemistry of the Faculty of Engineering, and in 1976 he was appointed Professor (*Kyoju*). In 1981 Yamazaki reached the mandatory retirement age of Universities in Tokyo and accepted a position as a Professor at the Kanagawa Dental College, where he stayed until 1988.

When Yamazaki started his academic work in 1945, electric power, water and food were in short supply and glassware and chemicals were almost non-existent. He consequently started working on thermodynamic calculations on sulfur vulcanization of hydrocarbon polymers.

In 1952, the petrochemical industry in Japan began to develop and Yamazaki became interested in the polymerization of olefins and dienes using co-ordination catalysts which were the general thrust in Kambara's laboratory. In 1963, the Department on Polymer Science was created with 6 Full (*koza*) Professors based upon the substantial input and the suggestions by Noboru Yamazaki and Ichitaro Uematsu. After 1965, Yamazaki had his own laboratory and began to work on the electrolytic initiation of polymerizations.

In 1971, Yamazaki began exploring new directions of research using synthetic organo-chemistry with specialized catalysts. This work led to his greatest achievement, the preparation of polyamides from diacids and diamines using alkyl phosphites as the "catalysts". Unlike polyphosphoric acid which was also investigated in several laboratories at that time, which gave relatively low molecular weight polymers, the alkyl phosphite catalysts gave high molecular weight polymers. While this technique is

the mildest and most efficient way to make polyamides and polyimides of high molecular weight, this new technique turned out to be not feasible from the economic and commercial point of view.

Yamazaki's scientific achievements and his international interests brought him appointments as Guest Professor at the University of Mexico, Mexico in 1978, and at the Institute of Polymer Science, Iasi, Romania in 1980.

In addition to his academic work, Noboru Yamazaki devoted much time and efforts to professional societies, especially the Society of Rubber Industry and the Society of Polymer Science, Japan (SPSJ) and was interested in their international relations: For many years, he was a Member of the Intersociety Relations Committee of the Division of Polymer Chemistry of the American Chemical Society.

Early in his career he chaired the committees on Reaction Engineering (1965–1972), on Carbon Dioxide Chemical Utilization (1974–1976), on Lecture Meetings (1976–1978) and the Planning Committee (1974–1976); for 14 years he was a member of the Program Committee.

From 1978 to 1980 Yamazaki was the Chairman of Kanto Branch of SPSJ, from 1972 to 1984 he was a Director of SPSJ, from 1984 he acted as Councilor, and from 1980 to 1982 he was Vice President of SPSJ.

In the Society of Rubber Industry, Yamazaki served as the Vice President from 1975–1981, and as President in 1984. He was Councilor from 1975–1981 and was elected Honorary Member in 1991.

Noboru Yamazaki devoted much of his life to rubber chemistry and rubber utilization. In 1977 he was co-chairman (with Maurice Morton) of the Japan-US Joint Symposium on Elastomers in Akron, OH; from 1980–1992 he was a member of International Rubber Conference Committee and served from 1985–1986 as its chairman. From 1982–1985, Yamazaki was the chairman of the Organizing Committee of IRC-85 KYOTO and in 1992 he was the co-chairman of the Japan-Korea joint Rubber Technology Symposium in Kyongju, Korea.

\*For the significance of special Japanese Birthdays, see also O. Vogl and T. Ouchi, *Polymer News*, 21(1), 18 (1996).

## Columns

Recently, in 1994, Yamazaki became a Director of the Japan Society of Seismic Isolation.

For his accomplishments to science and his service to professional societies, Yamazaki was awarded the Award for Distinguished Service for the Advancement of Polymer Science, SPSJ in 1982, the George Oenslager Award, a joint Award of the Chemical Society of Japan and the Society of Rubber Industry, Japan in 1990. In 1998 he received the International Rubber Conference Medal.

Noboru Yamazaki's research interests include: ionic polymerization, electro-initiated polymerizations, polymerizations with high energy compounds, sulfur vulcanization of rubbers, molecular composites, and organic-inorganic polymeric materials and seismic insulation with rubber materials. He published his work in about 200 articles, including 150 scientific papers and 30 Japanese and foreign patents. Yamazaki was also involved in the publication of 7 books and several book chapters and was also a member of the advisory boards of several prominent journals.

Noboru Yamazaki is a person with a variety of interests. He enjoyed playing outdoor sports, such as baseball, golf, tennis and even football. Now he is following these sports on television but he still is practicing "Yoga". He likes to read books, primarily on history and architecture and likes to compare the cultures of the Orient with that of Europe. Noboru speaks English, German and some French. He still travels, both at home and abroad and enjoys visiting castles and palaces. He always enjoys talking to the local people wherever he visits.

Demonstrating his interest in design and construction, Noboru drew the basic design of his home and his cottage himself. In 1986 he joined a research group of seismic insulation of buildings; this group is interested in the use of rubber bearings for individual and industrial constructions. He even found a piece of a rubber pad, used in 1889 in the construction of a rail viaduct, which was still in good working condition, indicating that using the right material, rubber can be of long lasting use.

In 1948 Noboru Yamazaki was married to the former Nobuko Satori of

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