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26. Itaru Mita

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Personalities in Polymer Science

Itaru Mita

Itaru Mita had an **important impact** on **recent developments of polymer chemistry** in Japan and abroad by **combining chemistry with physics** and by **understanding materials properties** to develop new insights into the process of polymerization as well as polymer degradation. His societal skills allowed him to interact on a wide basis in science, academia and governmental institutions in the Kanto (Tokyo) region.

Itaru Mita was born on August 20 1929, in Manchuria, China, as the second son of Taizo Mita and Takako Mita, the former Takako Fujimoto. Young Itaru has one brother Hiroshi and one sister, Yuki. He grew up and went to elementary and middle School in Manchuria. He then returned to Japan and went to high school in Tokyo.

Itaru Mita enrolled in the University of Tokyo in 1950 and graduated with a B.S in Chemistry in 1954. He continued his studies toward a master's degree which he obtained in 1956. Right after receiving his M.S., Mita joined the University of Tokyo as Lecturer (*Jo-shu*) in the Institute of Science and Technology, a position he held until 1962. He then was appointed in the Institute of Aeronautical Research as Associate Professor (*Jo-Kyoju*).

To further his education Itaru Mita went to France in 1957. He studied at the University of Paris for one year and then at the Centre de Recherche sur les Macromolécules in Strasbourg as a Research Associate. In Strasbourg he worked toward his doctoral degree and in 1960 was awarded the DSc. from the University of Strasbourg, with a thesis entitled *Contributions to the Study of Graft Copolymers*; Professor Henri Benoit was his Thesis Advisor.

After his return to Japan, Itaru Mita continued his academic career at the University of Tokyo. In 1972 Mita was offered the position of Full Professor (*Kyoju*) at the University, the Institute of Space and Aeronautical Science. In 1983 Mita moved to the Institute of Interdisciplinary Science and, in 1988, he was appointed Professor at the Research Center of Advanced Science and Technology, a position he maintained until the end of his academic career.

In 1990, when Mita reached the mandatory retirement age at Tokyo University, he became a Professor Emeritus. He then joined the Dow Corning Asia Company as Research Director of the Japan Research Center and was active until 1995. Since that time, he has been a consultant to Dow Corning Asia.

Itaru Mita received a number of significant Awards: In 1957 he received a Fellowship from the French Government. In 1990 he received the Distinguished Award of the Society of Polymer Science, Japan. Also in 1990, Mita received the Suga Weathering Award, and, in 1995, he was elected an Honorary Member of the Society of Polymer Science, Japan.

The work of Itaru Mita can be divided into two categories, one dealing with high temperature polymers and polymer degradation and the other with reactions controlled by dynamics (motion) and by thermodynamics. In the first category, Mita was able to explain the main patterns of the thermal degradation of vinyl polymers. He developed a method of photoinitiation for the thermal decomposition to control the radical concentrations and was able to determine the rate constants of the elementary reactions of polymer decompositions. He also studied the degradation of high temperature aromatic polymers and established that, at high temperature, crosslinking rather than chain scission becomes the predominant mode of degradation. He also showed how chemical changes are related to the change of the mechanical properties.

In the second category of the activities of Mita's research, he and his group have been able to show how the motion in the polymer matrix influences polymerization and reactivity on polymers. They have been able to show quantitatively that polymerization comes to a halt on vitrification for bulk vinyl polymerization. For thermosetting resins, the equivalent to the vitrification point is a specific crosslinking density. Below the glass transition temperature, some bimolecular reaction still can proceed, but at a very slow rate. Unimolecular reactions such as photochemical reactions are not affected by simple diffusion but by the free volume needed for the reaction to proceed. The photoisomerization of azobenzene was extensively studied in various polymer matrices.

Mita also showed by using polymers with luminescent groups on one or both chain ends, that the inter- and intramolecular reactions in dilute solutions that are diffusion controlled depend on the length of the polymer chain, model reactions for radical termination reactions.

Mita's work is published in a number of scientific journals, in periodicals and in several books. He is the author of about 200 scientific papers.

Mita was active in variou scientific publications. From 1984 to 1986 he was the Editor-in-Chief of the Polymer Journal. From 1977 to 1979, he was also the Editor-in-Chief of the Journal of Calorimetry and Thermal Analysis (in Japanese). He is still active on the Editorial Boards of Polymer Degradation and Stability (since 1975), of the Journal of Network Polymers (in Japanese) (since 1970) and is on the Advisory Board of the Journal of Photopolymers, Science and Technology (since 1975).

Itaru Mita served with distinction in the Society of Polymer Science, Japan. He was Vice President in 1984 to 1986 and President from 1990 to 1992. Since 1992 Mita is Councilor of the Society. He was recently elected an honorary member of the Society. In IUPAC, Mita served in the Commission of Macromolecular Nomenclature as a Titular Member from 1979 to 1989, as an Associate Member from 1977 to 1979 and from 1989 to 1991. Since 1992 he is a Consultant to the Commission.

Itaru Mita was extensively involved with several operations of the renowned

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Ministry of International Trade and Industry (MITI). From 1990 until the present he was a Member of the National Steering Committee of the Japanese Industrial Standards (JIS), from 1990 to 1995 he was the Chairman of the JIS Polymer Division, and now he is the Chairman of the JIS Chemistry Division. In the Agency of Science and Technology, he was a Member of the Materials Division, Committee of Aerospace and Electronic Technologies (1991 to 1994).

Itaru Mita has had various hobbies: He likes traveling, reads extensively and plays *Go*, a unique intellectual game which is frequently played in the Northern Far East, especially in Japan.

In 1962, Itaru Mita married the former Hisako Matsuo; they have two children, Noriyiki and Reiko and one granddaughter, Masami Goto.

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