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Personalities in Polymer Science



Hiroyuki Tadokoro

Honoring Professor Tadokoro on his 77th Birthday* [Kijyu]

Hiroyuki Tadokoro has pioneered the development of techniques for the structure analysis of polymer crystals. The methods developed are by now the accepted standards in this field as in his famous book "Structure of Crystalline Polymers".

Hiroyuki Tadokoro was born in Kochi City, Kochi Prefecture in January 28, 1920, the 9th year of the Taisho era, as the eldest son of Sukego Tadokoro II. His father was a principal at the Kochi Woodworking School for Young Men. Young Hiroyuki went to Elementary School and Middle School in Kochi which was at that time the equivalent of a High School today.

After graduating in 1936, he went to the Japan Imperial Naval Paymasters' School and then joined the Japan Imperial Navy. He served for three years.

In 1947, Tadokoro entered the Department of Science of Kochi College and in 1948 he enrolled in the Department of Chemistry, Faculty of Science, Osaka University. After two years he joined the laboratory of Isamu Nitta, who was one of the leading physical chemists in Japan. He was known for the establishment of the tetrahedral character of the carbon atom

by analyzing the crystal structure of pentaerythritol by X-ray diffraction. Tadokoro also analyzed the crystal structure of sulfamic acid.

After graduating from Osaka University in 1951, Hiroyuki Tadokoro worked in the Research Institute of the Dai-Nippon (Great Japan) Celluloid Co. The next year he joined Nitta's laboratory again as a student of the Graduate School of Science, Osaka University. In 1957 he became the Yukawa Scholarship Student of Osaka University. For his thesis, Tadokoro studied the crystallization behavior of polyvinyl alcohol (PVA) by means of X-ray diffraction, infrared spectroscopy and density measurement under the guidance by Dr. Shuzo Seki, who was a well known thermochemist. Tadokoro established the nature of the crystallization-sensitive bands of PVA, and obtained his Doctor of Science degree (Rigaku Hakushi) for his investigations on the "Structural Chemistry of Solid Poly(vinyl alcohol)".

In 1958, Tadokoro was employed as Lecturer (*Jo-Shu*) in Professor Murahashi's laboratory. [see *Polymer News* 22(4), 134 (1997)]. In 1959, the Department of Polymer Science which is now called the Department of Macromolecular Science was established in the Faculty of Science at Osaka University and Tadokoro moved from the Department of Chemistry to this new department. In 1960 he was promoted to Assistant Professor (*Ko-Shi*) and in 1962 to Associate Professor (*Jo-Kyoju*). In 1964, he became Full Professor (*Kyoju*) of Osaka University. This was a remarkable achievement since only 6 years had passed since he was first appointed at the University. In his new position as Full Professor, he opened the 3rd Laboratory (*kouza*) at the Department of Polymer Science as the laboratory of Polymer Solid Structure. In 1983, Tadokoro reached the mandatory retirement age at Osaka University and is now a Professor Emeritus.

Hiroyuki Tadokoro was not only active at Osaka University, but he was also invited by a number of universities to teach as a Guest Professor: Kyushu University (Faculty of Engineering), Nagoya University (Faculty of Engineering), Osaka City University

(Faculty of Science), Kobe University (Faculty of Science). He educated many students and coworkers who were or are now active in universities, official research institutes, and companies.

In his research Tadokoro analyzed the molecular and crystal structure of a number of polymers on the basis of organized combination between X-ray diffraction, vibrational spectroscopy and energy calculation. A summary of his work appears in his book written in Japanese in 1976 and in English in 1979. He also developed new theories to estimate and calculate physical properties of polymer crystals on the basis of information obtained by structure analysis and the understanding of macromolecular interactions.

Hiroyuki Tadokoro was very active in scientific publications for international journals as an Associate Editor of "Polymer". He was also on the Advisory Board and Editorial Board of the "Journal of Macromolecular Science (Physics)", "Polymer Journal", and "Kobunshi" (High-Polymer, Japan), and "Polymer Bulletin".

In his scientific career Tadokoro published about 250 scientific papers, 3 books, and 22 book chapters.

Because of his outstanding contributions to scientific research Hiroyuki Tadokoro received a number of Awards: The Award of the Society of Polymer Science, Japan in 1970, the Distinguished Award of the Society of Polymer Science, Japan, which means that he is now a Life Member of the Society. He is one of the first Japanese recipients of the High Polymer Physics Prize of the American Physical Society for his pioneering work in the structure analysis of polymer crystals which he shared in 1983 with Motowo Takayanagi. In 1990, he was decorated with the Third Order of the Sacred Treasure (ZUIHOSHIO).

In 1981, Tadokoro was appointed to the Committee of the Research Association for Basic Polymer Technology as a part of the R & D of Basic Technology for Future Industries sponsored by the Agency for Industrial Science and Technology of the Ministry of International Trade and Industry, Japan. This committee was charged to develop new polymer materials with

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

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outstanding mechanical properties for ten years.

Hiroyuki was always a person of such vigor, until tragedy struck just one year before his retirement in January 1982. He suffered a cerebral hemorrhage, from which he, fortunately, recovered partially. He has learned to live with this disability because he believed in his favorite poem written by Hickson, and quoted in the book "Scrambles Amongst the Alps" by Edward Whymper the conqueror of the Matterhorn.

'Tis a lesson you should heed, Try, try, try again. If at first you don't succeed, Try, try, try again. Then your courage should appear, For if you will persevere You will conquer, never fear. Try, try, try again.

Even as a youngster, Hiroyuki Tadokoro was an enthusiastic mountain climber and went climbing, mostly with his wife, all over the world, in particular in the European Alps. He is also an expert photographer and has specialized on photos of his beloved mountains. Many of his pictures are now on display in his house. He also likes to listen to classical music and is known to have sung loudly in front of his students the song "An die Freude" of the Symphony # 9 by Beethoven. Hiroyuki also reads poetry.

In 1951 Hiroyuki Tadokoro married the former Akiko Mizokami of Hiroshima. On their honeymoon they went mountain climbing in the Japan Alps. The Tadokoro's have two daughters; Toshiko Kobashi, an ophthalmologist and Yoshiko Hata; the Tadokoro's also have 4 grandchildren.

This article was prepared by **Otto Vogl***, Monbusho Professor, Kyoto Institute of Technology, Matsugasaki, Sakyo-ku, Kyoto 606, Japan and **Kohji Tashiro**, Department of Macromolecular Science, Graduate School of Science, Osaka University, Toyonaka, Osaka 560, Japan.