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## Professor Dr. X. D. Feng



Professor Dr. Xin-de Feng has significantly contributed to the creation and development of modern polymer chemistry in China. In the late 1940s he was the first professor to offer a course on polymer chemistry, and he helped in the development of polymer science through the organization of meetings and symposia involving both Chinese and foreign scientists.

X. D. Feng was born on October 12, 1915, in Tong-Li, a famous small town near Suzhou on a network of riverways with around 50 bridges as well as a spa with a long intellectual and cultural heritage. After elementary school in Tong-Li, he entered a middle school that was associated with Soochow (Suzhou) University in Suzhou. At that time he was given the English spelling name of Sing-Tuh Voong by his English mentor.

In 1933, X. D. Feng enrolled in Soochow University but transferred to Tsing-Hua University in Beijing after

his freshman year. At Tsing-Hua University he studied chemistry from his sophomore year and received his B. S. in 1937. Through a national competitive examination he was offered a national scholarship to study chemistry in the U.S.A. From the results of his entrance examination for graduate school at the University of Notre Dame, he was awarded the General Tire and Rubber Company Fellowship under the guidance of the famous Professor C. C. Price, who was Chairman of the Chemistry Department and who had just transferred from the University of Illinois—Urbana. During that time, from January 1946, Prof. Feng's American classmates called him Steve. He received his Ph. D. in 1948; after which he returned to China and became a Professor at the Chemistry Department of his alma mater, Tsing-Hua University, in Beijing, a position he held until 1952. In 1952 he was offered a Professorship in the Chemistry Department of Peking University, Beijing, where he established the Faculty of Polymer Chemistry and acted as the Director of Polymer Research until 1986.

Prof. Feng's many scientific contributions came from various areas of polymer chemistry including the following:

(a) The role of amine in redox and photoinduced polymerization: Feng's group extended the type of amines from tertiary to secondary, and even primary amines, with clarification and unification of the initiation reaction mechanism into steps including intimate ion pair formation, a cyclic transition state (CTS), and deprotonation to form the active initial radical species.<sup>1,2</sup> They proved the existence of the aminium radical in the form of a stable salt from the DMT (*N,N*-dimethyl-*p*-toluidine)/O<sub>2</sub>/CCl<sub>4</sub> system.<sup>1</sup> In the photoinduced polymerization, Feng was the first to apply the reaction to electronegative vinyl monomers such as acrylates and acrylonitrile, and he found the formation of an exciplex by two different situations.<sup>3</sup>

(b) The role of Ce<sup>4+</sup> in graft copolymerization: for the grafting reaction of hemocompatible biomedical polymers with Ce<sup>4+</sup> salt, Feng's group determined the grafting site of vinyl monomers onto poly(ether-urethane), and in 1985 they proved that in the reaction mechanism the N atom of the hard segment served as the grafting site.<sup>4</sup> Later, Feng reinvestigated the reactions of model compounds of chitosan and found a promising new reaction mechanism in 1993.<sup>5</sup>

(c) Living ring-opening polymerization of lactides and controlled drug delivery systems: Feng's group was the first to observe the living ring-opening polymerization of lactide and glycolide and the successful block copolymerization of  $\epsilon$ -caprolactone with both. With block copolymer as the matrix, they found that in a certain range of block length ratio prolonged active and zero-order release could be obtained in a drug delivery systems.<sup>6-8</sup> Recently he has modified the polymeric matrix for hydrophilic drug release using polymers such as poly(glycolic acid-*alt*-L-aspartic acid) of high molecular weight.<sup>9</sup>

(d) The role of O<sub>2</sub>-CCT (contact charge transfer) in polymer aging and bioaging processes: Feng's group studied the dark oxidation of various organic compounds, and they found the formation of an O<sub>2</sub>-CCT either on the donor atom in a hetero carbon chain or on the tertiary C atom,  $\alpha$ -C atom of C=C double bond, or the benzene ring during the initial stage of dark oxidation.<sup>10</sup> He proposed the O<sub>2</sub>-CCT theory of polymer aging and bioaging instead of the classical free radical theory.

Feng's work has been published in more than 250 papers both in English and Chinese. He has served as Editor-in-Chief of the *Chinese Journal of Polymer Science* (in English) and *Acta Polymerica Sinica* (in Chinese). He organized two main series of symposia in his professional activities in polymer science that opened China to the rest of scientific world: (1) since 1981, the "International Symposium on Polymeric Biomaterials" has met every two or three years, including the Post Symposium of 4th World Biomaterial Congress (Kyoto, 1988), which was held in Kunming, China, in May 1988; and (2) the "Bilateral China-Japan Symposium on Radical Polymerization", held every other year from 1980 to 1991 in Japan and China, which was extended to the "Asia Symposium on Polymerization and Related Process" since 1993. In 1984 he was a Guest Professor at the "Research Center of Biomaterial and Biomedical Polymers" of Kyoto University, and from 1986 to 1994 he served as the Affiliated Professor with the Center of Bioengineering at the University of Washington, Seattle. Feng is a member of the Chinese Chemical Society, the American Chemical Society, and the Controlled Release Society U.S.A. In 1980 he was elected

as an academican of the Chinese Academy of Sciences (CAS), and in 1989 he received the "Talent Award" from the Chinese Chemical Society. He was given "The Lecture Award" in 1984 and "The International Academic Award" in 1997, both from the Society of Polymer Science Japan. In 1998 Feng received the Chemical Prize of the HLHL (Ho Leung and Ho Lee Foundation of Hong Kong) Award of Scientific and Technological Progress and also the first prize of biomedical polymer research from the State Department of Education in China.

Feng was active in gymnastics, particularly on parallel bars, from middle school to Soochow University and Tsing-Hua University, and since his stay at Notre Dame University he has been a fan of American football and soccer. His hobby is cooking, which he considers as artistic chemistry.<sup>11</sup> In 1948, just before Feng returned to Beijing from the U.S., he married the former Jane X. Yeh of Jiangsu at the Tsing-Hua Alma Mater House in Shanghai.

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Qi-Feng Zhou

Department of Polymer Science & Engineering,  
Peking University,  
Beijing, 100871, China

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