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Polymer Science and Engineering in Universities of The People's Republic of China: South of the Yangtze River - Part II

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Polymer Science and Engineering in Universities of The People's Republic of China: South of the Yangtze River–Part II

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Nanjing, Jiangsu Province

Nanjing is one of the oldest cities in China. It was the political center and the capital of several dynasties of Chinese empires; it is now the capital of Jiangsu Province and a famous scenic resort, not far from Shanghai. It is a cultural center, having more than ten universities, most of which have a long history.

Nanjing University. Nanjing University, founded in 1902, is an institute of learning for literature and science. It consists of fifteen departments. Polymer science is a specialty in the Department of Chemistry. Its staff of 25 scientists, with academic degrees is responsible for the teaching of over 150 undergraduates and 15 graduate students.

Professor Yong Zhu is an expert in quantum organic chemistry. He is now working on cationic polymerization of alkenes and is also studying polymer blends and block copolymers of organo-silicon compounds. His group is investigating the synthesis and structure of multiphase polymers, polymers for medical applications, and the preparation of graft copolymers by anionic polymerization. Associate Professor Yuanshen Wang is interested in polymer physics;

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she is now studying structure and properties of block and graft copolymers. Her group also works on polymer characterization, particularly the surface physical properties and the mechanical properties of multiphase polymers; they are also interested in electrets in polymers and piezoelectric polymers. By means of NMR and other instrumental techniques, they are studying structure and molecular motion of polymers and the mechanism of crosslink formation in network polymers. Associate Professor Qinli Zhou is inter-

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ested in silicone chemistry. His group is investigating the synthesis of coupling agents and their application in polymer composites; he has developed new coupling agents for commercial use.

Nanjing College of Chemical Engineering. This college is specializing in chemical engineering particularly polymer engineering. Associate Professors Quida Ji and Zaijan Sun are the leaders of the faculty. Their research interest is in block copolymerization α-methylstyrene with other comonomers in the bulk; they are also investigating graft copolymerization of vinyl chloride on ethylene/propylene rubber and the role of particle distribution in vinyl chloride suspension polymerization.

Nanjing College of Chemical Engineering has a branch in Changzhou, another city in Jiangsu Province. This college is also called *Jiangsu College of Chemical Engineering.* It has a section which is interested in polymeric materials. The main subject of their research is to find applications of polymeric materials which involves the blending of polymers. The research which has been carried out so far is toughening of poly(vinyl chloride) by polybutadiene rubber or with chlorinated paraffins.

Hangzhou, Zhejiang Province

Hangzhou is one of the most famous scenic cities in China: its West Lake is especially well known throughout the world. Hangzhou is the capital of Zhejiang Province; it has an expanding industry, has highly developed educational and public health systems and has more than ten universities and colleges.

Zhejiang University. Zhejiang University, founded in 1897, is a university with a broad basis, but it concentrates on science and engineering. It is known for its excellence in teaching and research.

Zhejiang University has 15 departments, 4 research institutes, and 6 research sections. Research and the teaching of polymer science in this university is done in two divisions: polymer chemistry in the Department of Chemistry and polymer engineering in the Department of Chemical Engineering.

Polymer Building, Zhejiang University

In the polymer chemistry division, two professors, three associate professors, and twenty instructors are involved with the instruction of over 100 undergraduates and 10 graduate students. Professor Shilin Yang, who is the president of Zhejiang University, directs a group which is working on coordination polymerization, such as the copolymerization of α-olefins, the study of Ziegler-Natta-type initiator systems placed on support and improved with activators. Professor Zhuren Pan's group is involved in the study of addition polymerization, especially the search for new initiators for vinyl chloride polymerization, the kinetics of free-radical copolymerization, and polymerization reaction engineering. Professor Maotao Liu and his group are working on polymer solutions; they have studied the solution properties of polyelectrolytes and are developing new methods for the determination of molecular weight and molecular weight distribution. Associate Professor Zhiquan Shen and her group are investigating coordination polymerization with rare earth initiator systems and have succeeded in synthesizing even at room temperature polyacetylene of high cis content.

The research group of polymer engineering, with one professor, three associate professors, and five instructors, is concentrating on polymerization reactor engineering.

Hangzhou University. Hangzhou University is a comprehensive university of literature and science; it was formerly a part of the Zhejiang University and now consists of 14 departments and 11 research institutes and sections. Polymer science is taught at the Department of Chemistry and has 25 undergraduates per year and three graduate students, with a small faculty of six members. The research interests of the faculty members are: (1) the study of properties of polymer solutions (i.e., inherent viscosity, solvent selection, and determination of solubility parameters), (2) improvement of poly(vinyl chloride) properties by additives, (3) synthesis and properties of anionic ion-exchange resins and chelate resins (polyethylene benzyl thiourea resins), and (4) improvement of epoxy resin.

Wuhan, Hubei Province

Wuhan, a city of over 4 million people and the capital of Hubei Province, is located in the central part of China at the confluence of the Yangtze and Han rivers.

Wuhan University. Wuhan is one of China's oldest and best known universities; it was founded in 1913 and has just celebrated its 70th anniversary. Wuhan University consists of faculties of literature and science. The Chemistry Department was established in 1923. Initially it was part of the Department of Natural Science and before 1949 was rather small, with 40-50 undergraduate students and a number of staff positions of 12-15. Now the chemistry department has 150-180 first-year undergraduate students with 200 staff positions. The department admits about 30 graduate students every year. Most of these students, after a 3-year program of studies and a dissertation, receive a master's degree. Some of the laboratories of this Department have been approved by the Ministry of Education to admit Ph.D. candidates. The polymer science program at Wuhan University plays a very important role in polymer teaching in the PRC. One of the coauthors of this article (O. Vogl) spent some time recently at Wuhan University advising the University and President Liu, the Chemistry Department and the polymer program on graduate teaching and research in polymer science.

Most staff members of the Chemistry Department are engaged in both teaching and research; about one third are mainly engaged in research and guide only research projects.

The polymer science faculty in the Department of Chemistry has about 40 academically trained staff members including two professors and ten associate professors.

Professor Renxi Zhou is the leader of this division which consists of 5 research groups. Professor Zhou with Associate Professors Qusheng Cheng and Darkeng Ye are studying silicone polymers, nitrogroups containing adhesives, and poly(aryl ether sulfones). Additional work is being done on polymers for medical applications and polymeric drugs, for example antitumor agents containing polymers which 5-fluorouracil or thiouracil rings the polymer backbone chain. A group led by Associate Professor Xu Yuwa, including Associate Professors Yuanyin Chen, Yigeng Liu and Shihua Dong is also interested in the synthesis of functional polymers for medicinal use, polymeric (silicone) supported transition metal catalysts and polymeric crown ethers. Professor Peisen Li with Associate Professors Yonglin Mo and Shujiao Chang, in polymer physics, are studying solution properties of polymers, particularly polyelectrolytes. Associate Professor Zhaogeng's group is studying polymeric materials by mass spectroscopy and NMR methods. They are interested in the polymer structure of the Chinese lacquer, its antioxidant properties, and the structure of the enzyme in the Chinese lacquer. Associate Professor Zhengxiu Cao is involved in various facets of the engineering aspects of chemical reactions. A total of 20 graduate students are enrolled in the polymer program. Although no Ph.D. degree has been granted yet, it is expected to be given soon.

Fujian Province

Xiamen University. This university is situated in southeastern China on Xiamen Island amid a beautiful scenery. Xiamen University was founded in 1921 by the famous Chinese immigrant, Kahkee Tan and is now a national university of literature and science. The polymer division consists of nine faculty members including the two associate professors, Naimei Yu and Ronghua Pan. Sixteen undergraduate students per year are now studying polymer science at Xiamen University. The research subjects in polymer science at this university include: studies on the structure and properties of polymer blends, synthesis of functional polymers, temperature-resistant poly(aryl esters), photosensitive polymers, conductive polymers, and special adhesives. In addition, the research group at this university cooperates with local manufacturing industries by assisting in production.

Huachiao University. This university, situated at Quangzhou, has been specially established for students from among Chinese immigrants. It is a university of science and engineering in which the study of polymers is located within the Department of Chemistry and Chemical Engineering as a part of the division of organic chemistry. Six or seven undergraduates elect the polymer courses per year. Associate Professor Huiren Gong is working on epoxy resins and fluoropolymers, and has an expanding research program.