Polymer Program

INSTITUTE OF MATERIALS SCIENCE

Seminar: 11:10 am Friday, October 6

Science 1: Room 1002

Host: Yao Lin

Zhibin Guan

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Bioinspired Design of Active and Dynamic Polymer Materials

Abstract: Many biopolymers not only have advanced mechanical properties such as high modulus, toughness, and elasticity, but more importantly, exhibit dynamic characteristics including adaptive, malleable, and self-healing properties. Following inspirations from the Nature, Guan lab has developed various biomimetic soft materials imbued with active and dynamic properties. In one system, we have designed a series of biomimetic modular polymers with folded nano-domains as the repeat units. In another example, we have developed strong and autonomous self-healing polymers using various supramolecular and dynamic covalent interactions. Recently, we have also made significant progress in dissipative self-assembly of active materials. The overarching concept for all these projects is to build a direct link between microscopic molecular properties and macroscopic bulk performance. In this talk, I will discuss the design, synthesis, and property studies of these dynamic polymers including adaptive, active, and self-healing materials.

Bio: Zhibin was raised in Anhui Province, China and went to Beijing for his higher education. After finishing both his undergraduate and master's education at Peking University, he came to the United States for his Ph.D. He received his Ph.D. in 1994 at the University of North Carolina, Chapel Hill. Following a postdoctoral stint at Caltech and a short career at DuPont, in 2000 he joined the faculty of the Department of Chemistry at UC Irvine as an assistant professor. He was promoted to Associate Professor with tenure in 2004, and to Full Professor in 2006. From 2006, he also became affiliated faculty of the Department of Biomedical Engineering and the Department of Chemical Engineering and Material Science at UC Irvine. He has received recognition of his research with several awards and fellowships, including the Japan Society for the Promotion of Science (JSPS) Fellowship, the Humboldt Bessel Research Award, the Camille Dreyfus Teacher-Scholar Award, the NSF CAREER Award, the Beckman Young Investigator Award, and an elected Fellow of the American Association for the Advancement of Science. He was elected as the Chair for the 2018 Bioinspired Materials Gordon Research Conference.