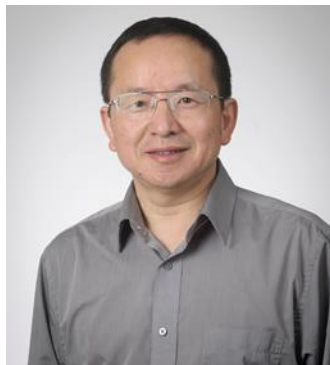


Deforming and Moving Polymers By Stimuli: One Step Towards Soft Robots



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Résumé/Abstract

Crosslinked liquid crystalline and (some) semicrystalline polymers with aligned mesogens or chains can exhibit reversible shape change as they undergo a phase transition between ordered and disordered state. If the phase transition is triggered by a stimulus (heat, light, electric field) and made to go back and forth repeatedly (generally through stimulation on/off cycles), the macroscopic shape change can be translated into some sort of controlled motion to mimic robot-like locomotion or doing-work against an external load. In this talk, I will report our research in recent years on such phase transition-based shape-changing polymers and showcase examples of using stimuli to move solid polymer pieces. I will also discuss some related issues such as materials design, dynamic networks, complex shape morphing and autonomous motion under constant stimulation.

Bio

Yue Zhao received his BSc in 1982 from Chengdu University of Science and Technology (now Sichuan University), and his Ph.D. in 1987 from École Supérieure de Physique et de Chimie Industrielles de Paris (ESPCI). After postdoctoral studies at Université Laval, Canada, he joined the Chemistry Department of Université de Sherbrooke in 1991 and has been a Full Professor since 2000. Zhao's main research interests are the design, synthesis, study and exploitation for applications of self-assembled, nanostructured and stimuli-responsive polymers, liquid crystalline and hybrid materials. He has published over 230 papers in primary journals. He was awarded the Changjiang Scholar Chair Professorship at Sichuan University by the Ministry of Education of China in 2007, the Macromolecular Science and Engineering Award of the Chemical Institute of Canada (CIC) in 2013, and elected Fellow of CIC in 2014