Polymer Seminar

Wednesday, December 4, 2024

11:00 am Science 1 - Room 1002

Host: Raji Kasi

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Programmable Actuation in Liquid Crystal Elastomer Films and Fibers

Abstract: The development of intelligent materials that can interact with their environment, regulate their actions, and even learn from input signals has become increasingly important in various fields such as wearable electronics, smart clothings, and soft robotics. While liquid crystals (LCs) are renowned for their success in flat panel displays, they can also offer intelligent and useful properties when incorporated into various polymeric forms. In this talk, I will present our recent works on the liquid crystal elastomers (LCEs) that integrate both the elastic properties of rubber and anisotropic properties of LCs. Unlike conventional isotropic elastomers, the anisotropic mechanical properties, self-assembled ordering and stimuli-responsivity through an order-disorder transition of LCEs can be exploited to create unique class of intelligent materials. By judiciously designing the molecular structure of LCEs and programming their orientations, we demonstrate 4D printable hygroscopic actuators, reprogrammable artificial muscles, mechanochromic sensors and smart textiles.

References

1. LINK
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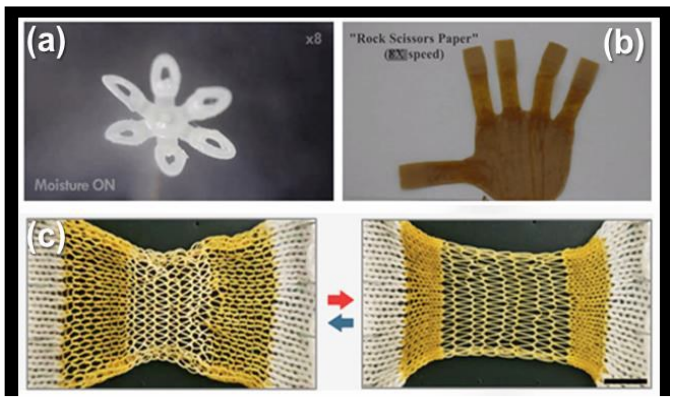

Figure 1. LCE-based (a) hygroscopic actuator, (b) artificial muscle, and (c) smart textiles

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