MATERIALS SCIENCE GRADUATE PROGRAM

SEMINAR ON LIQUID CRYSTALS

Fall 2024

KENT STATE UNIVERSITY

WEDNESDAY, SEPTEMBER 25TH 3:20PM

ZOOM MEETING

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From Anisotropic Molecules and Particles To Small-scale Robots: An Account of Liquid Crystals

Liquid crystals hold significant potential for advancing small-scale soft robots, particularly in biomedical applications. These robots aim to perform minimally invasive procedures in challenging environments, such as inside the human body. However, their widespread adoption is hindered by technical challenges related to fabrication, powering, and navigation. Liquid crystals, with their soft, ordered, and anisotropic structures, resemble the biological systems that inspire microrobotics. This makes them ideal for constructing actuators and robots. Notably, liquid crystal elastomers (LCEs) and networks (LCNs) exhibit desirable properties such as elasticity, responsiveness, and alignment, making them suitable for designing actuators in small-scale robots. Although thermotropic liquid crystals are commonly used, future research could explore alternative mesophases and lyotropic liquid crystals, offering new possibilities for biomedical microrobotics.

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