2026
PSK-이녹스 신진연구자 웨비나

2026년 3월 20일(금) PM 10:00 - 11:40 | 온라인 상

https://snu-ac-kr.zoom.us/j/3449875583

주 최 한국고분자학회 **주 관** 콜로이드 및 분자조립 부문위원회 **후 원** INNOX

○ 초대의 글

'PSK-이녹스 신진연구자 웨비나'는 우수한 연구역량을 가진 신진연구자를 발굴하여 교류의 장을 넓히고자 (주)이녹스의 후원과 한국고분자학회 주최로 마련한 온라인 세미나입니다. 이번 세미나에서는 고분자 분야 중에서도 특히 콜로이드 및 자기조립소재를 이용하여 선도연구를 수행하는 신진연구자의 우수한 연구성과를 공유하는 자리를 마련하였으니 관심있는 분들의 많은 참여 부탁드립니다.

○ 일정

AM 10:00 - 10:50

Shape-Specific Alignment Strategies for Liquid Crystal Elastomers: From Colors to Soft Robotics

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ABSTRACT: Liquid crystal elastomers (LCEs) offer an unparalleled platform for designing smart materials, yet a fundamental trade-off persists between achieving sophisticated molecular order and maintaining macroscopic structural integrity. In this work, I present a novel suite of shape-specific alignment strategies that decouple low-viscosity molecular mobility from structural stability, minimizing the aid of external templates that constrain shape or alignment. These strategies are showcased through two distinct pathways. First, I demonstrate the air-interface-mediated directed assembly of cholesteric LCEs within microtube architectures, where the oligomeric precursor's viscoelasticity facilitates both shape retention and mesogen assembly. Upon crosslinking, structural colors from the cholesteric phase and an inflatable tubular structure establish a 3D reconfigurable mechanochromic platform, enabling multi-mode responses from a single material. The synergy of molecular anisotropy and tubular geometry provides unprecedented strain sensitivity across the visible spectrum, allowing for sophisticated optical signaling that outperforms traditional films or fibers. Second, I present the development of bio-inspired soft robotics using fibers with complexly encoded alignment to mimic sophisticated biomimetic movements. By applying multi-mode mechanical encoding to partially crosslinked LCE matrices, I have engineered individual fibers that are architected to collectively generate targeted movements through their assembly. The influence of dangling chain migration on molecular alignment during flexural encoding is investigated, enabling the development of legged soft robots with versatile postural freedom and high-speed locomotion. Ultimately, these strategies establish a new design paradigm for programmable, stimuli-responsive soft architectures.

AM 10:50 - 11:40

Magnetic Nanoparticle–Mediated Control of Self-Assembly Pathways in Colloidal and Crystalline Materials

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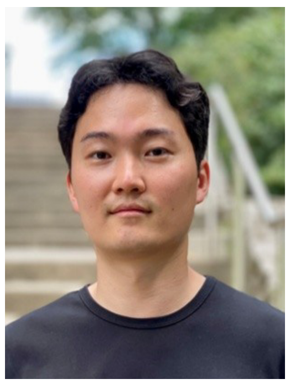

ABSTRACT: Self-assembly of nanoscale building blocks offers a powerful route to fabricate hierarchical materials with emergent optical, mechanical, and transport properties. However, conventional self-assembly is largely governed by intrinsic interparticle interactions and diffusion-limited processes, making it difficult to dynamically control orientation, spatial organization, and structural anisotropy across multiple length scales. Here, we introduce a magnetic field-mediated assembly strategy in which magnetic nanoparticles (MNPs) act as active intermediaries that translate external magnetic fields into localized forces, flow fields, or nucleation templates. This approach enables programmable control over assembly pathways rather than merely aligning preformed structures. In cellulose nanocrystal (CNC) suspensions, rotational magnetic fields generate azimuthal shear flow through magnetophoretic MNP coupling, producing highly ordered local chiral architectures and producing centimeter-scale, helicity-programmable chiral photonic films. In contrast, in metal–organic framework (MOF) systems, static magnetic fields induce the preassembly of MNP chains that act as one-dimensional nucleation scaffolds, directing interfacial growth of ZIF-L platelets into anisotropic, chain-like superstructures extending hundreds of micrometers. The resulting architectures exhibit interpenetrated, high-aspect-ratio morphologies. In addition, because the core of each ZIF-L chain cluster consists of arranged MNP chain, these chain clusters possess a larger net magnetic moment under an applied magnetic field. This increased magnetic response enables rapid field-driven rotation, fluid mixing, and particulate capture during dynamic magnetic actuation. These results establish a generalizable framework for magnetic nanoparticle–mediated regulation of self-assembly across fundamentally distinct material classes, enabling programmable anisotropy, hierarchical order, and field-responsive functionality at the mesoscale.

한국고분자학회
The Polymer Society of Korea