COLLOIDAL MICROGEL PARTICLES: CONFINEMENT OF LIQUID CRYSTALS AND CHARACTERIZATION

Mohan Srinivasarao, Georgia Institute of Technology, USA
mohan@mse.gatech.edu

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Liquid crystals that are confined within curved boundaries are of interest to many scientists due to their important role in optoelectronic technologies. As such, intensive research has been conducted with various types of liquid crystals constrained to droplets or cylindrical environments. Such studies are significant because the curvature of liquid crystals costs elastic energy, and hence, we observe rich physical phenomena such as change in the director field that otherwise would have been hidden. Most of the fundamental studies of liquid crystalline phases of cellulose nanocrystals were conducted in the cells with flat boundaries, limited to certain concentrations. Here, we report cellulose nanocrystals confined to *pnipam* microspheres using inverse emulsion polymerization technique with microfluidics device. The chiral nematic phase of cellulose nanocrystals are preserved within the polymer matrix, as characterized by optical microscopy. The droplet radius, R of the microgels can be adjusted by changing the volumetric flow rate of oil phase in a microfluidics device. Notably, the fabricated CNCs-PNIPAM microgels are able to exhibit swelling-deswelling behavior upon temperature change with well-organized structure. I will also discuss how one applies a real-space imaging technique, known as Differential Dynamic Microscopy (DDM), to characterize such microgel particles.