

FUNCTIONAL BIO-SYNTHETIC POLYMER NANOMATERIALS FOR ADVANCED APPLICATIONS

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THE INVITERS:

- PISAS management

- Bio-enabled hybrid nanomaterials represent a novel class of functional materials, which uses bio-derived materials, bioinspiration and biomimetic approaches to design hybrid materials and structures with co-assembled biological and synthetic components to bring best of two worlds: versatile diverse adaptive functions and mechanical strength, flexibility, and scalability [1]. In this talk, we summarize our recent results on functional hybrid nanomaterials from chiral nematic polysaccharides for adaptive chiroptical materials, magnetic photonic materials and optical computing. We discuss robust photonic nanomaterials from cellulose nanocrystals and nanofibers decorated with highly photoluminescent organic dyes, quantum dots and quantum nanowires for tailored emission of linear and circular polarized light [2]. Then, we present results on magnetically steerable uniform photonic organization of cellulose nanocrystals decorated with superparamagnetic nanoparticles [3]. Assembly under weak magnetic field gradients enables transformation from helicoidal cholesteric to uniaxial nematic phase with near-perfect orientation achieved across large areas, enhanced mechanical robustness, and fast actuation ability. Finally, we demonstrate biophotonic-encrypted field effect transistors with multi-valued logic elements for massive parallel computing and elevated encryption ability [4].
- **Thursday, Sept. 14th, 12.30 PM**
- **PISAS Lecture hall**

