

Chiral Engineering for New Nano-bio Platforms

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Recently, chirality of nanomaterials has been considered of much importance due to the potential application in chiral biocatalysis, biosensing, telecommunication, and display technologies. Chiral nanomaterials show the unique, exotic, and sensitive properties because chirality provides (1) the circular dichroism effect, which significantly enhances sensitivity; (2) the lock-and-key effect, which improves selectivity; (3) the optical rotatory power, which enables colorimetry signal generation; and (4) transparency in the magnetic fields. However, the control over chiral structures of nanogeometry is a great challenge to achieve due to their complexity. During the talk, I will introduce strategies including (1) chirality transfer from biomolecules to inorganic nanoparticles and amplification of optical activity of the nano-system by incorporating magnetic components that enable real-time optical applications and (2) chirality control of nanostructures using the ability of nanoparticles retaining circularly polarized information of light. The chiral-selective interactions between nanostructures and biosystems, e.g., cellular membranes and proteins, will also be covered.