グローバル COE 物質科学イノベーション講演会

演 題： **”Complex Assemblies of Ceramic Nanoparticles and Their Applications”**

講 師： **Prof. Shu-Hong Yu**

University of Science and Technology of China, China

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場 所：工学部材料化学棟 MC204

The huge diversity of hierarchical micro-/nano- rigid structures existing in biological systems is increasingly becoming a source of inspiration of materials scientists and engineers to create next generation advanced functional materials. Recently, accompanied with the development of nanotechnology, some biologically hierarchical rigid structures have been duplicated and mimicked in artificial materials through hierarchical organization of micro-/nano- building blocks. At first, we will report several facile synthetic protocols for one-pot controlled synthesis of several kinds of unique nano-building blocks, which include ultrathin nanowires, nanoplates, and magnetic nanoparticles, conducting nanocables, nanotubes, and carbon-based nanostructures. Then, we discuss how to assemble these nanobuilding blocks into ordered assemblies as well as their functionalities. Periodic ordered mesostructures of hydrophilic ultrathin nanowire thin films can be produced by Langmuir-Blodgett technique, which show reversibly switched photoelectric properties. In addition, We have fabricated a series of layered double hydroxides (LDH) or montmorillonite (MTM) micro/nano-platelets reinforced free-standing, strong, transparent, and functional layered organic-inorganic hybrid films using series of LDH micro/nano-platelets or MTM as building blocks. These assembled structures based on bio-inspired approaches will find potential applications in different fields. Recent advances have emphasized that it is possible to access a variety of high quality hybrid materials with tunable mechanical property and multifunctionalities.

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連絡先：工学研究院物質化学部門　吉川信一（内線：6739）
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