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1P-501

Facile Synthesis of Coordination Polymer Nanocubes and Post-Modification through Secondary Metal Ion Decoration

TRANMINHNGOC·MAI DUY HIEN·유효종†
한림대학교 (hyojong@hallym.ac.kr†)

Coordination polymer particles (CPPs) are generally formed through the coordination-driven assembly of metal ions or clusters with multitopic organic linkers. Their high degree of porosity, well-defined pore size, and structural tailorability render them promising candidates for diverse applications. Herein, we report a shape-controllable synthetic protocol for Zinc-based coordination polymer nanocubes (Zn-CPNs). In the synthesis, 2,6-bis[(4-carboxyanilino)carbonyl] pyridine ([N3]) ligand is employed as an efficient shape-directing modulator to control the size and shape of Zn-CPNs. More importantly, the Zn-CPNs provide plenty of metal binding sites and beneficial defects in the structure, which is suitable for the coordination of other functional metal ions. The secondary metal ion-modified Zn-CPNs exhibit improved catalytic activities.

Keywords: zinc-based coordination polymer nanocubes, shape-directing modulator, size and shape controls, post-modification, heterogeneous catalytic reaction

1P-502

Facile Fabrication of Heterometallic Nanostructures through a Controllable Growth of Palladium Shells onto Gold Multipod Nanoparticle Cores

LE THI CAM VAN·MAI DUY HIEN·유효종†
한림대학교 (hyojong@hallym.ac.kr†)

Heterometallic nanostructures, such as bimetallic core-shell nanostructures and alloy structures, have been extensively investigated due to their potential applications in many fields including catalysis, electronics, sensors, and biomedicine. Despite much advances in nano-engineering, the overgrowth of secondary materials onto presynthesized seeds in a controllable manner to form core-shell configurations are still practically challenging. Herein, we report a high yielding and facile fabrication of bimetallic nanostructures through the expitaxial or islanded overgrowth of Pd shells onto gold multipod nanoparticle core (GMN@Pd NPs). Such hybrid nanostructures with anisotropic components could lead to significantly enhanced physical and chemical properties due to the possible synergistic effect.

Keywords: Gold Multipod Nanoparticles, Core-Shell, Nanohybrid, Palladium Shell, Expitaxial Growth

1P-503

Metal-ion Tuning in Amine-Functionalized Supramolecular Triple-Stranded Helicates and Their Higher-Order Polymeic Assemblies

LE THI CAM VAN·MAI DUY HIEN·강필재·유효종†
한림대학교 (hyojong@hallym.ac.kr†)

With respect to the design of metallosupramolecules, the choice of metal ions is of considerable importance for the targeted crystal structures. Herein, we report a strategy to achieve isostructural amine-functionalized supramolecules containing different transition metals (cobalt, nickel, and manganese), namely, $M_8(PDA)_6(AIP)_3(DMF)_6$, where M = Co (**1**), Ni (**2**), and Mn (**3**) (PDA = 2,6-pyridinedicarboxylate, AIP = 5-aminoisophthalate, DMF = dimethylformamide). The variation in the transition metal ions used negligibly affects the coordinative assembly of metal and ligand species, suggesting a high degree of symmetry and stability of triple-stranded helical conformations. In addition, the change in metal ions can lead to distinctive physical or chemical properties of the resultant TSHs. In addition, **1**, **2**, and **3** can be employed as conceptual supramolecular modules for the construction of higher-order polymeric structures via the coordination with extra metal ions.

Keywords: Triple-Stranded Helicate, Metal Tuning, Multileve Assembly, Higher-order Polymer

1P-504

Synthesis of Metallosupramolecular Nanocages through the Assembly of Triple-Stranded Helicates

HO VAN MINH HAI·MAI DUY HIEN·유효종†
한림대학교 (hyojong@hallym.ac.kr†)

Triple-stranded helicates-based metallosupramolecular nanocages are susccessfully synthesized through unique multiple assembly strategy. The prepared discrete molecular nanocages are considered the assembly of six triple-stranded helicates interconnected by four metallic junctions. These are unusual examples of a highly symmetric discrete molecular architectures, resulting from the coordination-driven assembly of in-situ generated modules. The right- and left-handed triple-stranded helicates, structurally analogous to the basic building blocks in molecular nanocages can be synthesized in separated reactions. Owing to the presence of structurally well-defined, highly systematic, and robust cavities of the synthesized cages, the molecular nanocage shows much higher CO_2 capture capacity and selectivity compared with the triple-stranded helicates and other single molecules.

Keywords: Discrete Molecular Cage, Triple-Stranded Helicate, Tertiary Assembly, Selective CO_2 Uptake

1P-505

Controllable Synthesis and Application of Dendritic Fibrous Nanosilica (DFNS)/Gold (Au) Hybrid Nanomaterials

정소은·TRAN MINH NGOC·유효종†
한림대학교 (hyojong@hallym.ac.kr†)

Dendritic fibrous nanosilica (DFNS) with a high surface area is successfully employed as a template to synthesize DFNS/Au hybrid nanomaterials. Au nanodots are initially synthesized by the selective reduction of Au ion on the surface of the DFNS after surface modification to form DFNS/Au dots. A seed-mediated growth method is used to controllably grow Au nanoparticles on the DFNS/Au dots to generate DFNS core-Au NPs shell nanoparticles (DFNS/Au NPs) and DFNS core-Au layer shell nanoparticles (DFNS/Au layers). The catalytic activities of DFNS/Au NPs and DFNS/Au layers in the 4-nitrophenol reduction reaction are compared.

Keywords: 4-nitrophenol reduction, Au layer, core-shell nanostructures, dendritic fibrous nanosilica, silica-metal hybrid nanoparticle

1P-506

Metallocavitand-Induced Cage-like Crystal Packing within High-Order Cobalt Cluster-based Supramolecular Assemblies

강필재·MAI DUY HIEN·유효종†
한림대학교 (hyojong@hallym.ac.kr†)

A cobalt (Co) supramolecular triple-stranded helicate, $[Co_8(PDA)_6(Br\text{-}PTA)_3(DMF)_4(H_2O)_2]$ (**1**) (PDA = 2,6-pyridinedicarboxylate, *Br*-PTA = 5-bromoisophthalate, DMF = dimethylformamide), is successfully synthesized and fully characterized. The solid-state structure of **1** shows that four cobalt atoms are coordinated by three PDA ligands to form a tetranuclear cobalt cluster with three extension points and the ditopic *Br*-PTA ligands interlink two basic assembly units. In crystal