Hao Jing, PhD

Assistant Professor, Department of Chemistry & Biochemistry

Education

PhD, Chemistry, University of South Carolina

Key Interests

Nanoparticles | Noble Metal | Plasmon Resonances | Upconversion | Photocatalysis | Energy | Fingerprint Imaging

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SELECT PUBLICATIONS

- H. Jing *et al.*, Tunable plasmonic nanoparticles with catalytically active high-index facets. *Nano Letters* 14, 3674-3682 (2014).
- H. Jing *et al.*, Structural evolution of Ag-Pd bimetallic nanoparticles through controlled galvanic replacement: effects of mild reducing agents. *Chemistry of Materials* 27, 2172-2180 (2015).
- H. Jing *et al.*, Epitaxial growth of Cu2O on Ag allows for fine control over particle geometries and optical properties of Ag-Cu2O core-shell nanoparticles. *Journal of Physical Chemistry C* 118, 19948-19963 (2014).
- H. Jing *et al.*, Controlled overgrowth of Pd on AG nanorods. *Cryst Eng Comm.* 16, 9469-9477 (2014).

Research Focus

The research objectives focus on the synthesis and characterization of optically-active gold and/or silver nanoparticles as well as hybrid nanostructures made of two or more compounds with a high degree of dispersed uniformity in size and shape. These questions are investigated via simple and robust wet chemistry methods based on the characteristics of the solution.

The second research focus is on lanthanide-doped or rare-earth doped upconversion nanoparticles (UCNPs) which is a unique type of luminescent nanosubstance with the capabilities to convert low-energy (long wavelength), near-infrared photons into high-energy (short wavelength), fluorescent emissions which are highly tunable across the ultraviolet (UV) and visible spectral regions.

Current Projects

- We are currently interested in metal-semiconductor core-shell hybrid hetero-nanostructures with extinction peaks tuned to near-infrared (NIR) spectral region. This will lead to the efficient conversion of solar energy especially the NIR portions into chemical energy through photocatalytic reactions by utilizing novel anisotropic hybrid nanostructures.
- Another current project is the rational design of smart probes based on NIR-excited lanthanide-doped upconversion nanoparticles (UCNPs) for latent fingerprint imaging and particularly, encryption.
- We are also interested in intelligent NIR light-triggered anticancer drug release utilizing novel nanostructures based on UCNPs and their derivatives due to their remarkable advantages such as deep penetration depth, no blinking or biotoxicity and non-invasiveness.