OCCI Lecture

Speaker:

Professor Julia Xiaojun Zhao Department of Chemistry, University of North Dakota



Title: Fluorescent Nanomaterials, Synthesis, Properties and Bioapplications

Date, Time and Place: Friday, February 3, 10 am, TB342

Abstract

A series of fluorescent nanomaterials have been developed in Dr. Zhao's group, including silica-based dye-doped nanoparticles, graphene quantum dots, and metal-enhaced fluorescent nanomaterials. The distinct features of these nanomaterials are 1) highly intense and photostable fluorescence signals, 2) tunable fluorescence wavelengths, and 3) low toxicity. Several metallic-based sandwich nanostructures were developed with various shapes and sizes for further enhanced fluorescence. The geometric, compositional, and dimensional effects of these materials on their fluorescence properties were studied, including fluorescence quantum yield, lifetime and wavelengths. These nanomaterials were applied to biological applications including sensitive detection and imaging of trace analytes, and photothermal therapies. Nanomaterial-based photothermal therapy has shown great potential for efficient cancer treatment. The developed nanohybrids can generate significant amount of heat upon irradiation in the near infrared (NIR) region for inducing thermal cell death. The nanohybrids showed excellent in *vitro* biocompatibility as a promising hyperthermia agent.