



Synthesis and characterization of $\text{CaF}_2:\text{Yb,Er}/\text{CaF}_2$ core/shell up-conversion nanoparticles

by Mr. Liu Zhengyi

Date: 17th September 2009 (Thursday)
Time: 12:30pm to 1:00pm
Venue: EA-02-11 (Executive Seminar Room)

Abstract

With the development of nanotechnology, the inorganic luminescence materials have attracted increasing attention for its great potential for bio-application. Among them, the rare-earth doped up-conversion nanoparticles take the advantages of improved signal-to-noise ratio, increased tissue penetration, reduced photo-bleaching and reduced photo-toxicity as well as the use of inexpensive 980 NIR laser as the pumping source. Here, the monodispersed $\text{CaF}_2:\text{Yb,Er}$ upconversion nanoparticles (particle size $\sim 5.4 \text{ nm} \pm 0.9 \text{ nm}$) were synthesised using thermolysis of precursors in oleylamine. An undoped CaF_2 shell was subsequently deposited on the doped core nanoparticles. The core/shell upconversion nanoparticles remained monodispersed (particle size $\sim 6.9 \text{ nm} \pm 1.2 \text{ nm}$). Compared to the core nanoparticles, the core/shell nanoparticles showed a ~ 11 times increase of total emission intensity and a ~ 30 times increase in red emission intensity. $\text{CaF}_2:\text{Yb,Er}/\text{CaF}_2$ Core/shell up-conversion nanoparticles showing strong red emission, with longer wavelength and penetration distance compared to that of shorter wavelengths of green and blue lights, may find promising potentials in bio-applications.

Mr. Liu Zhengyi Speaker

Mr. Liu Zhengyi obtained his bachelor's degree in Chemical Engineering (Applied Chemistry) from Dalian University of Technology (DUT) in 2008. He is now doing his postgraduate study under the guidance of Prof. Chow Gan Moog in Department of Materials Science and Engineering, NUS. His research interests lie in synthesis, spectroscopic investigation, and application of up-conversion nanoparticles.

Dr Xue Jun Min Host

All are Welcome!