



Synthesis of Monodisperse Magnetite Octahedra-shaped nanoparticles

by Miss Yang Yang

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

Abstract

The synthesis of magnetite nanoparticles is based on the thermal decomposition of iron acetylacetonate ($\text{Fe}(\text{acac})_3$) in benzyl ether with the presence of oleic acid as capping agent. The as-synthesized iron oxide nanoparticles have an octahedral shape as characterized by SEM, TEM and HRTEM. Particle diameter can be tuned from sub-10-nm up to several hundred nanometers by adjusting experimental parameters, which hence covers both superparamagnetic and ferrimagnetic regimes of iron oxide (The critical superparamagnetic size for iron oxide nanoparticles was found to be around 20 nm). The magnetic properties of the magnetite octahedra with different sizes were studied using vibrating sample magnetometer (VSM). Moreover, the structural information of the as-synthesized nanooctahedra with different sizes was obtained from X-ray diffraction (XRD), and the results further confirmed that the particle sizes could be well controlled. Herein, a typical synthesis of 53 nm-sized iron oxide nanoparticles was studied particularly. Based on the as-synthesis monodisperse nanoparticles, some kinds of self-assembly were also reported. As we know, assembly of nanoparticles as building blocks is strongly affected by their shapes. So compared with the spherical shaped Fe_3O_4 nanoparticles, some novel self-assemblies appeared, which may broaden the field for application.

Miss Yang Yang Speaker

Miss Yang Yang received her bachelor's degree in Materials Science and Engineering from Dalian Jiao Tong University in 2005. She is currently a second year Ph.D. candidate in Dept. of Materials Science and Engineering, NUS. She is under the guidance of Associate Professor Ding Jun and her recent research project is synthesis of magnetite nanoparticles by chemical route.

Dr Xue Jun Min Host

All are Welcome!