



Magnetic properties of Cu nanoclusters embedded in ZnO Thin Films

by Mr. Toh Chen Chin

Date: 22nd October 2009 (Thursday)
Time: 12:00pm to 12:30pm
Venue: EA-02-11 (Executive Seminar Room)

Abstract

The search for the origin of ferromagnetism in diluted magnetic semiconductors never ends since most of the theories or experiments still cannot clarify whether ferromagnetism originated from semiconductor matrixes themselves or the transition metal precipitates (secondary phases) and their clustering. In this study, the nonmagnetic transition metal Cu clusters was embedded in the insulating oxide DMS material, zinc oxide by using a nanocluster beam deposition technique. The induced magnetism are purely originated from the exchange coupling between the metal clusters or exchange coupling between the clusters and the matrix, since both matrix and the clusters are nonmagnetic materials. The effects of the cluster size and distance among the clusters on the magnetic properties were investigated and tuned by the sputtering power and sputtering time. The magnetism results indicated the Cu-embedded ZnO were superparamagnetic material. The isolated clusters can contribute to the superparamagnetism of the films, while the agglomerated Cu clusters tended to lose their magnetic properties. The details of embedded cluster system and the corresponding magnetism mechanisms will be discussed.

Mr. Toh Chen Chin Speaker

Mr. Toh Chen Chin obtained his bachelor's degree in Materials Science and Engineering from University of Science Malaysia (USM) in 2007. He is now doing his Master degree study under the guidance of Dr. Chen Jingsheng in Department of Materials Science and Engineering, NUS. His research interests focus on the nanoclusters assembled films.

Dr Xue Jun Min Host

All are Welcome!