STRUCTURE AND MAGNETIC PROPERTIES OF Ni/NiO,
Co/CoO COMPOSITE FILMS

by Mr. Yi Jiabao

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Abstract
Exchange coupling between antiferromagnet and ferromagnet is very important for the spintronic devices, such as GMR reading head, MRAM and recording media etc. The antiferromagnet plays an important role in these devices. Hence, in this project, antiferromagnetic NiO and CoO, Ni/NiO, CoO/Co composite were investigated. It was found that NiO in the armorphous state is antiferromagnetic. NiO in the cluster state is ferromagnetic dominant and nanocrystalline NiO consists of antiferromagnetic core and surface spins. By coupling cluster-NiO with Ni, a saturation magnetization of as high as 91 emu/g at room temperature was obtained. By coupling nanocrystalline-NiO (2-4 nm) with Ni using magnetic annealing method, the composite showed a coercivity as high as 2.4 kOe at room temperature. CoO/Co composite prepared by post annealing also resulted in a high coercivity.

Speaker Mr. Yi Jiabao

Mr. Yi Jiabao got his bachelor degree from Tianjin University, China and worked as an engineer in Beijing Electronic Tube Group Corp. on the gas sensors and gas detectors. He was research engineer in the Department of Mechanical Engineering, NUS. He is currently a research fellow and PhD candidate in the Department of Materials Science and Engineering, NUS. His PhD study focuses on the nanomagnetics and exchange coupling phenomenon.

ALL ARE WELCOME!