Subject: MSD Colloquium, Zabel, Thurs, 9/27, 11am, 212, A-157
From: Suzanne Kokosz <kokosz@anl.gov>
Date: Thu, 30 Aug 2007 08:33:37 -0500
To: Materials Science Division <msd@anl.gov>

MATERIALS SCIENCE COLLOQUIUM

SPEAKER: DR. HARTMUT ZABEL
Ruhr-Universität Bochum, GERMANY

TITLE: [3]Magnetic Properties of Spintronic Materials[2]

DATE: Thursday, September 27, 2007

TIME: 11:00 a.m.

PLACE: Building 212, Room A-157

HOST: Axel Hoffmann

Refreshments will be available at 10:45 a.m.

Abstract:

Spintronic materials either qualify as dilute magnetic semiconductors (DMS) for spin alignment, or as ferromagnetic metals with very high spin polarization at interfaces for efficient spin injection or spin tunneling. In this talk I will present our recent work on both types of spintronic materials. In DMS materials a fraction of non-magnetic host semiconductor atoms is replaced by magnetic ions either by co-evaporation or by ion implantation. Recently several oxide-based DMS have been reported to be promising candidates for room temperature ferromagnets. In particular, Co-doped TiO2 and ZnO have great potentials as robust ferromagnets with a Curie temperature well above room temperature. Using x-ray circular magnetic dichroism and resonant magnetic x-ray scattering (XRMS) we could confirm the magnetic state of Co2+ in the host matrix. Moreover, we have also observed magnetic dichroism at the O K edge at room temperature, supporting the intrinsic nature of the observed ferromagnetism in Co-implantedTiO2 and ZnO. We have also studied the Heusler half metal Co2MnGe alloy to determine the interface magnetic profile for different interfaces (V, Au, MgO, Al2O3) using Polarized Neutron Reflectivity (PNR) and XRMS. In [Co2MnGe/Al2O3]n multilayers we find a magnetization profile definitely different from the nuclear density profile with non ferromagnetic interlayes at the top and the bottom of each Heusler layer, while for [Co2MnGe/MgO]n multilayers the magnetization profile of the Heusler layers is found to be nearly identical to the chemical profile.

Work performed together with: N. Akdogan, B. Aktas, H.-W. Becker, A. Bergmann, J. Grabis, R.I. Khaibullin, A. Nefedov, B.Z. Rameev, C. Somsen, L.R. Tagirov, M. Vadala, A. Westphalen, K. Westerholt.

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