MAT Science Week
April 24-27, 2018 at GSI, Darmstadt

Beitrag ID: **23** Typ: **Oral**

Layer stability and interface properties of single- and bi-layer magnetite films grown on MgO(001) substrates

Dienstag, 24. April 2018 18:00 (20 Minuten)

An increasing interest is focused on the epitaxial magnetite (Fe3O4)-based films due to their potential application as spin dependent transport devices.
We present our study of the composition and layer structure of the single-layer Fe3O4 and bi-layer Fe3O4/Fe films epitaxially deposited on MgO(001) substrates. We focus on underlining the influence of thermal annealing and ion beam irradiation on the layer and interface properties to gain information about the film stability and/or its changes in external conditions, such as temperature, air exposure and ion-beam exposure. The films in different states were investigated by combined X-ray reflectometry and Rutherford backscattering spectrometry (RBS). The crystalinity of the films was studied by RBS-channeling experiments. For investigating the atomic transport processes, we used inner-gas and metallic ions (Ar, Kr, Au) with energy of 1-2 MeV to modify (tailor) samples by controlled irradiation experiments.
The most important finding is that the bi-layer structure of magnetite films are well preserved upon ion irradiations despite of a large decrease of the layer thickness, whereas it disappeared completely as a consequence of a full oxidation of Fe buffer layer upon annealing.

The ion beam experiments were performed in a collaboration with RBS groups in the Institute of Nuclear Physics of the University Frankfurt/Main and Nuclear Physics Institute, The Academy of Sciences of the Czech Republic, Rez, Czech Republic

Autor: Frau KRUPSKA, Magdalena (Nanostructure Laboratory, Institute of Physics, Pedagogical University, Podchorazych 2, 30-084 Cracow, Poland)

Co-Autoren: Prof. BALOGH, Adam G. (Institute of Materials Science, Technische Universität Darmstadt, 64287 Darmstadt, Germany); Prof. KIM-NGAN, N. - T. H. (Nanostructure Laboratory, Institute of Physics, Pedagogical University, Podchorazych 2, 30-084 Cracow, Poland); Frau SOWA, Sylwia (Nanostructure Laboratory, Institute of Physics, Pedagogical University, Podchorazych 2, 30-084 Cracow, Poland)

Vortragende(r): Frau KRUPSKA, Magdalena (Nanostructure Laboratory, Institute of Physics, Pedagogical University, Podchorazych 2, 30-084 Cracow, Poland)

Sitzung Einordnung: Mat Science Week

Track Klassifizierung: Annual Workshop on Ion and Particle Beams (Ionenstrahl Workshop)