(100)-oriented GaAs substrate by low-temperature molecular beam epitaxy. An unusual strong thermoelectric signal was observed as a response to the pulsed laser beam on the structure. The signal can be modeled by an electrical dipole induced in the area of the laser spot. In a temperature range well below the Curie temperature $T_C \approx 70K$ where the in-plane magnetic anisotropy of the ferromagnetic film is biaxial we were able to image structures that are similar to already observed ferromagnetic domains in $Ga_{1-x}Mn_xAs$ films by Kerr microscopy.

MA 15.19 Tue 15:00 Poster A

Magneto-optical Kerr effect of EuO Thin Films — •S. Altendorf, R. Sutarto, T. Haupricht, and L. H. Tjeng — II. Physikalisches Institut, Universität zu Köln, Zülpicher Str. 77, 50937 Köln, Germany

EuO is a ferromagnetic semiconductor with a Curie temperature (T_C) of 69 K [1]. Large magneto-optical effects such as a specific Faraday rotation of 5×10^5 degrees per cm [2] were reported making this compound an interesting starting material for research and applications in the field of magneto-optics.

We report on our measurements of the magneto-optical Kerr effect (MOKE) of EuO thin films. EuO thin films were grown on a 50 nm Cr layer on Al_2O_3 substrates by means of molecular beam epitaxy using a distillation technique which allows a precise control of the stoichiometry. The dependence of the Kerr rotation on the film thickness and temperature is investigated.

[1] A. Mauger and C. Godart, Phys. Rep. **141**, 51 (1986)
[2] K. Ahn and J. Suits, IEEE Trans. Mag. **3**, 453 (1967)

MA 15.20 Tue 15:00 Poster A

Preparation, Capping and Characterization of Gd doped EuO Thin Films — •T. Haupricht[1], R. Sutarto[1], H. Ott[1], N. Hollmann[1], H. Hartmann[1], T. Lorenz[1], Z. Hu[1], C. F. Chang[1], H. H. Hsieh[2], H. J. Lin[3], C. T. Chen[3], P. Nagel[4], S. Schuppler[4], and L. H. Tjeng[1] — [1]II. Physikalisches Institut, Universität zu Köln, Zülpicher Str. 77, 50937 Köln, Germany — [2]Chung Cheng Institute of Technology, National Defense University, Taoyuan 335, Taiwan — [3]NSRRC, 101 Hsin-Ann Road, Hsinchu 30076, Taiwan — [4]ANKA, Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen, Germany

EuO belongs to the rare class of ferromagnetic semiconductors. By electron doping the Curie temperature (T_C) of 69 K for stoichiometric bulk EuO can be enhanced up to 160 K [1].

We report on the growth and characterization of Gd doped EuO thin films. We prepared samples by means of MBE under distillation conditions, which allows a very precise control of the oxygen stoichiometry. Using LEED and RHEED we show that the EuO films can be grown epitaxially and that the [100] directions of the films and MgO substrates are aligned. In order to perform *ex-situ* measurements we covered the samples with Au and Al capping layers. Using Vibrating Sample Magnetometry we investigated the dependence of T_C on Gd doping and O deficiency. We have observed record high T_C's of 170 K for a Gd concentration of about 4% [2].

[1] A. Mauger and C. Godart, Phys. Rep. **141**, 51 (1986)
[2] H. Ott et al., Phys. Rev. B **73**, 094407 (2006)

MA 15.21 Tue 15:00 Poster A

Spinresolved Photoemission Spectroscopy of Amorphous CoFeB — •Martin Sperlich[1], Coen Smits[1], Reza Gadhimi[4], Frank Matthes[2], Theodoros Dimopoulos[3], Joachim Wecker[3], Claus M. Schneider[2], and Gernot Güntherodt[1] — [1]II. Physik. Inst., RWTH Aachen — [2]Inst. für Festkörperforschung, FZ Jülich — [3]Siemens AG, Corporate Technology — [4]Gemeinschaftsinstitut für Elektronenmikroskopie, RWTH Aachen

Tunnel magnetoresistance (TMR) junctions of the system CoFeB/MgO/CoFeB based on amorphous CoFeB show the highest TMR values of all FM/MgO/FM junctions (FM = ferromagnet) of over 350% at room temperature [1]. This is very surprising since the highest TMR values have been theoretically predicted for epitaxial junctions. Due to annealing the TMR values increase which is attributed to a surface crystallisation of the amorphous CoFeB at the interface with MgO. By means of UV Spin-polarised Photoemission Spectroscopy (SP-PES) we have investigated the spin polarisation of amorphous CoFeB films. On a relative scale compared to tunneling the spin polarisation obtained from SP-PES gives an indication of the influence of annealing processes on the TMR values. Upon annealing at 275 °C the spin polarization of CoFeB increases by a factor of two. This is explained by the onset of surface crystallisation of CoFeB and a reduction of oxygen at its surface. We paid special attention to the metal/oxide interfaces by using Mg/MgO overlayers on CoFeB. The oxidation states of Mg were controlled by the position of the Mg 2p core levels. - [1] Y.M. Lee et al., Appl. Phys. Lett. 89, 042506 (2006)

MA 15.22 Tue 15:00 Poster A

Magnetic anisotropy in $Fe_{1-x}Co_x$ films on Pd(001), Pd/Cu(001) and Pd/GaAs(001) — •Xiuli Fu, Feng Luo, Jochen Barthel, Marek Przybylski, and Jurgen Kirschner — Max-Planck-Institut fur Mikrostrukturphysik, Halle, Germany

Tetragonally distorted $Fe_{1-x}Co_x$ alloy films were grown on Pd(001) at room temperature (RT) by molecular beam epitaxy using thermal evaporation from two effusion cells. First-principles calculations for such films predict a high uniaxial magnetic anisotropy energy for specific values of the lattice distortion and the alloy composition x. Magneto-optical Kerr effect measurements have shown that the magnetic anisotropy depends strongly on temperature. For example, the out-of-plane easy axis of magnetization is observed for $Fe_{0.5}Co_{0.5}$ films up to the thickness of 14 ML at 60 K, whereas at RT the films are magnetized in-plane. A thermal expansion and related changes of the tetragonal distortion are supposed to be responsible for this effect. The explanation is verified by a comparison to the $Fe_{1-x}Co_x$ alloy films grown on a Pd buffer layer on Cu(001) and GaAs(001). Such systems are characterized by different thermal expansion coefficients. Additionally, the tetragonal distortion can be controlled by the thickness of the Pd buffer layer. It decreases for the growth on Cu(001) and increases for the growth on GaAs(001) with decreasing Pd thickness.

MA 15.23 Tue 15:00 Poster A

Magnetic anisotropy in ultrathin Pd,Au/Fe bilayers on GaAs(001) — Oleksander Mosendz[1], Jan Zukrowski[2], Bartek Kardasz[1], Bret Heinrich[1], •Marek Przybylski[3], and Jurgen Kirschner[3] — [1]Simon Fraser University, Vancouver, Canada — [2]AGH University of Science and Technology, Krakow, Poland — [3]Max-Planck-Institut fur Mikrostrukturphysik, Halle, Germany

The role of the deposition technique on the magnetic anisotropies in Fe/GaAs(001) based structures was investigated by ferromagnetic resonance (FMR) and conversion electron Mössbauer spectroscopy (CEMS). The Fe layers were prepared by thermal deposition (TD) or by pulsed laser deposition (PLD) techniques. For CEMS experiments, the ^{57}Fe probe layer was placed either in the Fe/GaAs(001) interface, in the interface with the Au or Pd coating layers, or at various depth of the films. To assure film continuity and a Curie temperature well above room temperature (RT), the total film thickness was kept around 10 ML of Fe. CEMS spectra, measured ex situ at RT, show that TD samples have a better interface lattice structure than those deposited by means of PLD. Further, diffusion of As into the film volume is detected from the spectra. Interestingly, even the upper interface is affected by the deposition technique due to As floating on top of the Fe film. It is shown that perpendicular anisotropy is mostly increased at the Fe/Au(001) interface, and becomes maximum for the PLD-grown Fe films. PLD also increases the magnetic damping which is caused by two magnon scattering.

MA 15.24 Tue 15:00 Poster A

X-ray magnetic linear dichroism in reflection and absorption spectra measured in the vicinity of the $L_{2,3}$ edges of ultrathin cobalt films on W(110) — •Nagamony Ponpandian, Armin Kleibert, Stefan Gutzeit, Stefan Polei, and Karl-Heinz Meiwes-Broer — Institut für Physik, Universität Rostock, Universitätsplatz 3, D-18051 Rostock

X-ray magnetic linear dichroism (XMLD) is a valuable tool to measure the magnetocrystalline anisotropy energy (MAE) of thin films and multilayers in an element specific and even in laterally resolved manner. Normally, the XMLD in absorption is a quite weak effect in the important case of the 3*d* transition metals. However, recent experiments revealed a strong enhancement in XMLD-type effects when detecting the specular reflectivity instead of the absorption. In order to investigate the origin of this enhancement we studied the XMLD both in absorption and reflection in epitaxially grown Co films on W(110). These samples possess atomically flat interfaces and thus are well suited for reflectivity experiments. Moreover, they exhibit a thickness dependent MAE. In this contribution we will compare the experimentally observed effects in reflection with respective calculations based on a 4×4-matrix formalism. Furthermore, we will address the anisotropy in the shape of the XMLD spectra and its theoretically predicted relation