Hard and soft x-ray reflectivity studies of $(NiFe/Au/Co/Au)_{10}$ magnetic multilayers

B. Szymański[a], F. Stobiecki[a], T. Weis[b], D. Engel[b], M. Urbaniak[a], P. Kuświk[a], D. Lengemann[b], A. Ehresmann[b]

[a]Institute of Molecular Physics, Polish Academy of Sciences, ul. Smoluchowskiego 17, 60-179 Poznań, Poland

[b]Institute of Physics (EP IV) and Center for Interdisciplinary Nanostructure Science and Technology (CINSaT), University of Kassel, Heinrich-Plett-Str. 40, D-34132 Kassel, Germany

9.7 cm

Sputter deposited ($Ni_{80}Fe_{20}$ 2nm/Au 2.2nm/Co t_{Co}/Au 2.2nm)$_{10}$ multilayers (MLs) with t_{Co} in the $0.4 \div 1.2$ nm thickness range were investigated using hard x-ray diffraction and soft x-ray resonant magnetic scattering (SXRMS). SXRMS combines the element specificity of magnetic circular dichroism with conventional specular reflectivity. Specular reflectivity curves were measured with standard, unpolarized Cu K_α radiation (photon energy 8040 eV) and circularly polarized synchrotron radiation tuned to Co L_3 (778.4 eV) and Ni L_3 (853 eV) absorption edges. Structural properties (chemical periodicity and roughness) of the MLs were determined from reflectivity curve of the hard x-ray. Comparison of reflectivity dependence versus scattering vector q measured at different photon energies have shown: (i) different shapes of satellite Bragg peaks, (ii) small difference in their position, (iii) different ranges of q for appearance of Kiessig fringes. Analysis of soft x-ray reflectivity measured as a function of magnetic field allowed us to determine magnetization reversal of Co and NiFe layers separately.

13.4 cm

Subject category :

5. Nano-structure, Surfaces, and Interfaces

Presentation mode :
poster

Corresponding author :
B. Szymański

Address for correspondence :
Institute of Molecular Physics
Polish Academy of Sciences
ul. Smoluchowskiego 17, 60-179 Poznań
Poland

Email address :
szyman@ifmpan.poznan.pl