PECULIAR MAGNETO-OPTICAL AND MAGNETIC PROPERTIES OF Au-Fe ALLOY FILMS AND Au/Fe MULTILAYERED FILMS

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9.7 cm

In this study, peculiar magneto-optical (MO) and magnetic properties of Fe-Au alloy films and Au/Fe multilayered films (MLF) were investigated. (3.0 nm Fe / t_{Au})$_{20}$ MLF (where t_{Au} = 1.0, 2.0, 2.5 and 3.0 nm) were prepared by rf-sputtering onto glass substrates with a Au buffer layer of 20 nm in thickness. In order to carry out the computer simulations, information on the MO and optical parameters of the materials that constitute the real multilayered structure should be known in advance. For this purpose we also prepared Au, Fe and $Au_{1-x}Fe_x$ ($0 < x < 1$) films of about 100 - 150 nm in thickness at the same deposition conditions. The structures of Au/Fe MLF and Au-Fe alloy films were analyzed by using the low- and high-angle XRD. The MO properties (equatorial Kerr effect) were studied at room temperature. The theoretical simulations of the MO spectra for the Au/Fe MLF were performed by solving exactly a multireflection problem using the scattering matrix approach with suitable MLF models. The origin of the prominent structure observed in the UV range of the MO spectra was discussed in connection with the results of magnetic circular dichroism analysis.

13.4 cm

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