ANISOTROPY DISTRIBUTION IN Ni-Fe/Au/Co/Au MULTILAYERS

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Multilayers comprising thin exchange decoupled Ni-Fe (2 nm) and Co (0.4, 0.6, 0.8, and 1.2 nm) layers in contact with Au (2 nm) are known to possess alternating in-plane (Ni-Fe) and out-of plane anisotropies (Co). However, little is known how the anisotropy is distributed across these multilayers. In this contribution we investigated anisotropy distribution in [Ni-Fe/Au/Co/Au]×10 multilayers grown by sputtering on Si (100) substrates. The samples were studied by means of ferromagnetic resonance at X- and Q-bands. The angular dependent energy density observed can be explained by two main contributions to the magnetic anisotropy: the uniaxial shape anisotropy, K_{sh}, and an effective second order anisotropy, K^U_{eff}. Due to negligible exchange interlayer coupling, the Ni-Fe and Co layers can be regarded as independent. It is concluded that for Ni-Fe layers the uniaxial anisotropy negligible except the first layer(s) next to the substrate. The uniaxial perpendicular anisotropy of Co layers depends on Co thickness in a standard way, $K^U_{eff} \times t$ *vs. t,* and varies as a function of the position from the substrate in a range of ~10% of K^U_{eff} (i.e., ~ 1.5×10^6 erg/cm3). Detailed information on the internal magnetic structure of the multilayers can be inferred from our investigations.