Perpendicular magnetic anisotropy in Au/CoFeB/Au system – static and dynamic characterization

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Magnetic thin film systems with perpendicular magnetic anisotropy (PMA) constantly attract attention due to their scientific and application potential. Nowadays the CoFeB layers characterized by PMA are extensively studied as a magnetic thin film system for magnetic random access memory. In CoFeB films PMA can be achieved by a contact with MgO layer and annealing or without annealing with noble metals, like Pd or Pt. Here we present novel layered system (Au/CoFeB/Au) which exhibits PMA without annealing. Using polar magnetooptical Kerr effect and vector network analyzer ferromagnetic resonance (VNA-FMR) measurements we found that spin reorientation transition from out-of-plane to in-plane anisotropy occurs at CoFeB thickness (t_{CoFeB}) of 1.1 nm. Additionally, from VNA-FMR we determined that g-factor of Au/CoFeB/Au system measured in the in-plane (out-of-plane) configuration decreases (increases) with decreasing t_{CoFeB}. We observed a linear dependence of g-factor on $1/t_{\mathrm{CoFeB}}$, what suggests that the effect is interfacial in origin. The g-factor can be explained in terms of the s-d hybridization at CoFeB/Au interfaces.

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