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Field-dependent perpendicular magnetic anisotropy and interfacial metal-insulator transition in CoFeB/MgO systems IGOR BARSUKOV, University of California, Irvine, YU FU, INAC/CEA, Grenoble, France, C. SAFRANSKI, YU-JIN CHEN, B. YOUNGBLOOD, University of California, Irvine, A. GONCALVES, L. SAMPAIO, CBPF, Rio de Janeiro, Brazil, R. ARIAS, Universidad de Chile, Santiago, Chile, M. SPASOVA, M. FARLE, CeNIDE, University Duisburg-Essen, Duisburg, Germany, I. KRIVOROTOV, University of California, Irvine — The CoFeB/MgO systems play a central role in magnetic tunnel junction devices due to the high tunneling magnetoresistance ratio. A strong perpendicular anisotropy (PMA) and voltage-controlled anisotropy are beneficial for spintronics application. We study PMA in thin films of Ta/$Co_{20}Fe_{60}B_{20}$/MgO in the thickness range of 0.9-2.5 nm and find that it can be best described by the first two order terms. Surprisingly, we find PMA to be strongly field-dependent [1]. Our results show that the field dependence has significant implications for determining and customizing magnetic anisotropy in spintronic applications. Our data suggest that it can be caused by an inhomogeneous interfacial spin pinning with a possibly ferrimagnetic phase at the CoFeB/MgO interface. We perform magnetometry and transport measurements and find a magnetization peak and resistance transitions at 160K, which are consistent with the presence of an interfacial oxide phase undergoing a Morin-like [2] transition. [1] I. Barsukov et al., 105, 152403 (2014) [2] F. J. Morin, Phys. Rev. Lett. 3, 34 (1959)

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