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Spin transfer torque switching in perpendicular magnetic tunnel junctions with Co based multilayer[1] TOSHIHIKO NAGASE, Corporate R&D Center, Toshiba Corporation, KATSUYA NISHIYAMA, MASAHIKO NAKAYAMA, NAOHARU SHIMOMURA, MINORU AMANO, TATSUYA KISHI, HIROAKI YODA — It has been reported that spin transfer torque switching in the perpendicular magnetic device has the advantage of improving the spin-torque efficiency in comparison with the in-plane one [1, 2]. Our previous study was the first time to demonstrate the spin transfer switching in perpendicular magnetic tunnel junctions (MTJs) using TbCoFe alloy. In this paper, we report studies on the spin-torque efficiency in MgO based perpendicular MTJs consisting of CoFeB wedge/[Pd/Co]x2/Pd free layer and FePt/CoFeB reference layer. The damping constant α of the free layer increases in the thinner parts of the CoFeB thickness because of the effect of spin pumping. The ratio of the switching current density to the thermal stability factor (Jc/Δ), which corresponds to the spin-torque efficiency, was estimated. It was found that the free layer with the thicker CoFeB had a lower Jc/Δ because of its smaller α. Our results experimentally clarify that reducing α leads to achieving the low switching current. [1] S. Mangin et al., Nature Materials 5, 210 (2006) [2] M. Nakayama et al., BB-09, 52nd MMM conference (2007).

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