Influence of intermixing at the Ta/CoFeB interface on spin Hall angle in Ta/CoFeB/MgO heterostructures

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Spin-orbit interactions provides mechanisms of spin polarization induction even in non-magnetic metals. In adjacent ferromagnetic layer, the effective magnetic fields are generated, which can lead to magnetization switching or dynamics precession through spin-orbit-torque. Magnetic and structural measurements indicate that Ta/CoFeB interface can not be considered as a sharp transition. Fitting to the temperature dependence of damping-like and field-like torques were performed with an additional contribution from the Ta/CoFeB interface taken into account in the spin diffusion model. In this approach, the temperature variations of the spin Hall angle in the Ta underlayer and at the Ta/CoFeB interface are determined separately.

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