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Temperature dependence of spin-orbit torques in a bulk perpendicularly magnetized Tb_xCo_{1-x} alloy film[1] KOHEI UEDA, MAXWELL MANN, GEOFFREY BEACH, MIT — Current-driven spin-orbit torques (SOTs) in ultra-thin ferromagnet/heavy metals with strong spin orbit coupling has been shown to be efficient way for manipulating magnetization [1,2]. Damping-like (DL) SOT is most relevant to highly efficient magnetization switching due to spin Hall effect [2]. Recently, some groups have reported SOT efficiency in ferrimagnet alloy films with bulk perpendicular magnetic anisotropy, which becomes potential candidate for the futures spin-orbit device with large thermal stability [3-5]. However, mechanism of spin transport still remains questionable issues in magnetic compensated ferrimagnet alloy film strongly depending on the temperature and composition. Here, we report DL-SOT efficiency (χ_{DL}) for various temperatures in a Ta/Tb_xCo_{1-x} bi-layers film, characterized by conventional harmonic voltage measurement. As decreasing temperature, coercively field (H_c) showed an increase and decrease below 200 K, whereas the saturation magnetization (M_s) does opposite behavior to the H_c, since two sublattices of Co and Tb are equal in magnitude due to the magnetic compensation point (T_M). Furthermore, it is found that χ_{DL} showed the maximum, approaching to T_M. This result is consistent with a relation that χ_{DL} is inversely proportional to M_s [5].

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