19a-S2-3

Voltage induced anisotropy change in FeGd

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4f metals are interesting materials to investigate a voltage-induced magnetic anisotropy change. The reasons are as follows; (i) the voltage effect might be large since 4f metals have a large contribution of the orbital in the magnetic moment which can be modulated by an electric-field (ii) to investigate the mechanism of the voltage effect, characterizing the contribution of the orbital angular momentum is essential. In the present study, we have employed the Gd, and investigated the voltage effect in FeGd alloy. The FeGd thin film is placed in the magnetic tunnel junction (MTJ) as a free layer and the voltage induced magnetic anisotropy change in it has been characterized.

MTJs was fabricated to characterize the voltage-induced anisotropy change [1] in the FeGd/MgO interface. The film structure is /V buffer (30 nm)/**$Fe_{90}Gd_{10}$ or Fe**/MgO barrier (1.4 nm)/Fe (10 nm) as shown in Fig. 1, which is made by a molecular beam epitaxy method. The FeGd alloy layer was prepared using co-evaporation of pure Fe and Gd. The V buffer is known to induce large interfacial anisotropy [2,3].We measured magnetoresistance (MR) to characterize the voltage effect in FeGd. Figure 2 shows the normalized MR curve under in-plane magnetic field of $Fe_{90}Gd_{10}$ (0.63 nm) and Fe (0.55 nm), where the DC voltage of +1 V and -1 V is applied. From the Fig. 2, a coercive field change by voltage of the Fe90Gd10 is larger than that of the Fe.

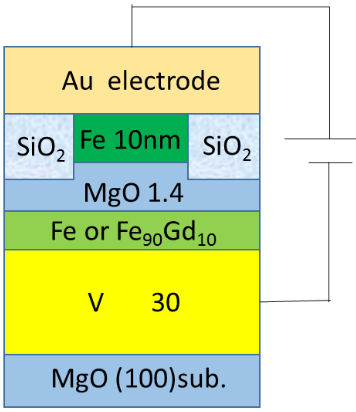

Fig. 1　Sample structure

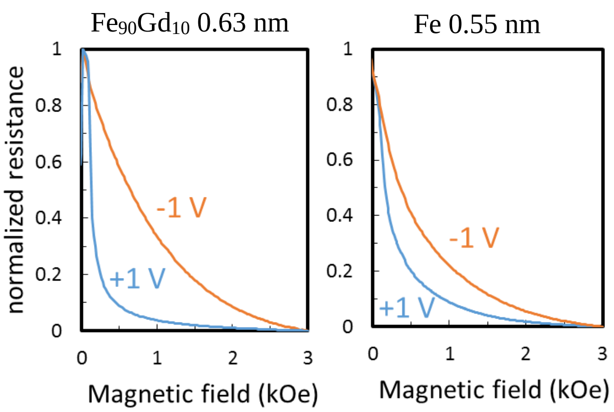

Fig. 2　Magnetoresistance in FeGd and Fe magnetic tunnel junctions

[1] Y. Shiota *et al.*, *Nat. Mater.* **11**, 39–43 (2012) [2] A. Rajanikanth *et al.*, *APL* **103**, 062402 (2013).
[3] K. Tanaka *et al.*, JSAP spring conference, 17a-E7-34 (2014).