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Effect of displacement damages on physical properties of amorphous TbFeCo thin films[1] JIWEI LU, TOM ANUNIWAT, XIAOPU LI, JOE POON, University of Virginia, BRAD WEAVER, Naval Research Lab — The ferrimagnetism in amorphous rare-earth transition metal alloys is well known, and has recently been investigated for applications in perpendicular magnetic random access memory (p-MRAM), which is considered to be a universal memory technology due to the low power dissipation and the non-volatility. The amorphous TbFeCo (TFC) thin films were deposited by rf magneton sputtering. The as-deposited film exhibited a low saturation magnetization and a high perpendicular anisotropy. Hall bar devices were fabricated for characterizing the magneto-transport behaviors. The proton irradiation, known for creating displacement damages, was to modify the short range ordering in amorphous TFC film. The Stopping and Range of Ions in Matters simulation demonstrates large cascade of rare-earth element during irradiation event that might cause the local structural damage. Both thin film samples and Hall bar devices were exposed to 2 MeV-energy protons with incremental fluences up to 1.9x10^{15} H^+/cm^2. We observed the increase in saturation moment and electrical resistance. The irradiated samples exhibit a compensation point below room temperature. The saturated anomalous Hall resistance remained relatively unchanged despite of the increased saturation moment.

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