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Monte Carlo Simulation of GdFeCo Amorphous Films with Perpendicular Magnetic Anisotropy XIAOPU LI, CHUNG T. MA, S. JOSEPH POON, NATTAWUT ANUNIWAT, JIWEI LU, Univ of Virginia — Amorphous ferrimagnetic $Gd_xFe_{93-x}Co_7$ alloy films have been reported with a tunable perpendicular magnetic anisotropy in both the low-Gd region (20 <x <34) and the high-Gd region (52 <x <59) [1]. The compositional and temperature dependence of their saturation magnetization is attributed to the competition between antiferromagnetic coupling of rare-earth (RE) with transition-metal (TM) ions and ferromagnetic interaction between the TM ions. Here, we present a computational model of the RE-TM amorphous structure using the Monte Carlo simulation method. The classical atomistic spin Hamiltonian has been used considering a model of random crystalline alloy. To obtain a consistent magnetization with the experimental data, we find it necessary to assume Gd spins having a non-collinear sperimagnetic structure, which origins from the anisotropy term. The calculated saturation magnetizations exhibit compensation phenomena for the low-Gd region and ferromagnetic transition behavior for the high-Gd region, in agreement with experiment. The results are analyzed in light of the sublattice magnetizations. [1] Manli Ding, S. Joseph Poon, J. Magn. Magn. Mater. 339, 51-55 (2013).

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