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Magnetoresistive anomaly in amorphous GdFeCo thin films NATTAWUT ANUNIWAT, XIAOPU LI, JOSEPH POON, JIWEI LU, University of Virginia — Spin valves generally consist of two ferromagnetic layers sandwiching a thin non-magnetic layer. High and Low resistance states can be obtained depending upon the relative magnetization alignment of the ferromagnetic layers. Recently, unexpected spin-valves like magneto-resistance has been observed in disordered ferrimagnetic crystalline material [1] and antiferromagnetic-based tunnel junction [2]. Here, we demonstrate spin-valve-like magnetoresistance in amorphous ferrimagnetic thin films. The amorphous GdFeCo films were deposited by rf magneton sputtering with the thickness $\sim$ 60 nm. The as-deposited film exhibited low saturation moment as $M_S \sim 80$ emu/cm^3. The compensation temperature is also observed near room temperature. The magneto-transport properties are performed on patterned Hall bar as a function of temperature ranging from 50K to 400K. The anomalous Hall resistance exhibits the same compensation temperature as magnetic moment. The asymmetric magnetoresistance reverse polarity at temperature below the compensation point indicating the different scattering mechanism than the anomalous Hall effect. We also demonstrate the bi-stable magneto-resistance with the absence of external H fields as a function of temperature up to 400K. The possible origins of this asymmetric MR will also be discussed.

[1] S. Singh, et al., Phys Rev Lett **109**, 246601 (2012).
[2] B. G. Park, et al., Nat Mater **10**, 347 (2011).

Nattawut Anuniwat
University of Virginia

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