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Large anomalous Hall effect in Pt interfaced with perpendicular anisotropy ferrimagnetic insulator¹ CHI TANG, PATHIKUMAR SELLAPPAN, YAWEN LIU, JAVIER GARAY, JING SHI, University of California-Riverside, SHINES TEAM — We demonstrate the strain induced perpendicular magnetic anisotropy (PMA) in a ferrimagnetic insulator (FMI), $\text{Tm}_3\text{Fe}_5\text{O}_{12}$ (TIG) and the first observation of large anomalous Hall effect (AHE) in TIG/Pt bilayers. Atomically flat TIG films were deposited by a laser molecular beam epitaxy system on (111)-orientated substituted gadolinium gallium garnet substrates. The strength of PMA could be effectively tuned by controlling the oxygen pressure during deposition. Sharp squared anomalous Hall hysteresis loops were observed in bilayers of TIG/Pt over a range of thicknesses of Pt, with the maximum AHE conductivity reaching 1 S/cm at room temperature. The AHE vanishes when a 5 nm Cu layer was inserted between Pt and TIG, strongly indicating the proximity-induced ferromagnetism in Pt. The large AHE in the bilayer structures demonstrates a potential use of PMA-FMI related heterostructures in spintronics.

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