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Dzyaloshinskii-Moria Interaction in CoNiPt tri-layer heterostructures. KASUNI NANAYAKKARA, Georgia State University, Atlanta, GA, RYAN FREEMAN, Emory University, Atlanta, GA, MADISON HANBERRY, Georgia State University, Atlanta, GA, SERGEI URAZHDIN, Emory University, Atlanta, GA, ALEXANDER KOZHANOV, Georgia State University, Atlanta, GA — Ultrathin magnetic multilayer structures with perpendicular magnetic anisotropic (PMA) and strong Dzyaloshinskii-Moria interaction (DMI) is potentially important for non-volatile memory and logic applications. CoPt bilayer system is a well-known PMA material system with strong DMI. However, thick magnetic films with multiple CoPt layer repetitions have vanishing effective DMI due to its inversion symmetry. In this work we investigate ultrathin CoNiPt heterostructures in which Ni layer breaks the inversion symmetry. Multilayer structures with the number of CoNiPt tri-layers varying from 1 to 10 were grown by DC sputtering technique. Vibrating sample magnetometer was used to measure out-of-plane hysteresis loops indicating PMA. Magneto-optic Kerr effect microscopy was used to analyze the magnetization switching dynamics. We observed bubble-type domains for films with up to 4 CoNiPt tri-layers and labyrinth-like stripe domains for 5 and more repetitions. Domain wall motion in presence of in- and out-of-plane magnetic field pulse combination was recorded. Domain wall creep velocity model is used to extract effective DMI. DMI evolution with the number of tri-layers and as a function of individual layer thicknesses was analyzed.

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