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Magnetization Reversal Dynamics in CoNi Heterostructures RONGXING CAO, Emory University, Atlanta, GA, KASUNI NANAYAKKARA, MADISON HANBERRY, Georgia State University, Atlanta, GA, SERGEI URAZHDIN, Emory University, Atlanta, GA, ALEXANDER KOZHANOV, Georgia State University, Atlanta, GA — Ultrathin ferromagnetic films with perpendicular magnetic anisotropy are of great potential for information processing and storage applications. Magnetization switching in these materials undergoes through a complex process that includes domain nucleation and evolution. In this work we present experimental results of magnetization reversal of $(CoNi)_n$ multilayer films with varying Ni thickness and number of CoNi bilayer repetitions. $(CoNi)_n$ films were grown by the magnetron sputtering technique. Vibrating sample magnetometry and magneto-optic Kerr effect magnetometry measured out-of-plane hysteresis curves with curve measurement times varying from 0.01s to 1hr. Significant dependence of the hysteresis loop shape on loop measurement times indicated slow magnetization relaxation processes taking place. Magneto-optic Kerr effect microscopy was used to study relaxation processes at constant reversing magnetic fields. Domain nucleation and their evolution into a dendritic structure was observed. Direct observation of a domain structure and its analysis revealed fast and slow magnetization reversal processes dependent on the reversing field magnitude, Ni thickness and number bi-layer repetitions. We apply several magnetization switching models to analyze experimental results.

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