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Effect of perpendicular magnetic anisotropy and Dzyaloshinskii-Moriya interaction on the enhancement of domain wall creep velocity in Pt/Co thin films by piezoelectric strain[1] PHILIPPA M. SHEPLEY, GAVIN BURNELL, THOMAS A. MOORE, University of Leeds — We investigate piezoelectric strain control of domain wall creep motion in perpendicularly magnetized Pt/Co thin films. Domain wall (DW) motion has potential applications in data storage and spintronics, where the use of voltages rather than magnetic fields to control magnetization reversal could reduce power consumption. Materials with perpendicular magnetic anisotropy (PMA) are of particular interest due to their narrow domain walls and potential for efficient current-induced DW motion. Sputtered Ta/Pt/Co(t)/X films (t=0.78-1.0nm, X= Pt, Ir/Pt or Ir) on thin glass substrates were bonded to biaxial piezoelectric transducers, to which 150V was applied to produce a tensile out-of-plane strain of $9x10^{-4}$. This reduced the PMA by $10kJ/m^3$ and increased the DW creep velocity by up to 90%. DW energy can be calculated from the PMA and the Dzyaloshinskii-Moriya interaction (DMI) field. DW creep measurements of DMI field found no change with strain. The change in DW velocity with strain is linear with the change in DW energy for Pt/Co DWs with a mixed Bloch-Neel structure. Pt/Co/Pt films with higher DW velocity changes were found to have purely Bloch DWs. We conclude that the velocity of Bloch DWs is more sensitive to strain-induced changes than that of Bloch-Neel DWs.

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