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**Domain Structures and Anisotropy in Exchange-coupled [Co/Pd]-NiFe and [Co/Ni]-NiFe Multilayers** LARYSA TRYPUTEN, MIT, SUNJAE CHUNG, MAJID MOHSENI, T.N. ANH NGUYEN, JOHAN ÅKERMAN, KTH Royal Institute of Technology, FENG GUO, ROBERT D. MCMICHAEL, NIST, CAROLINE A. ROSS, MIT — Exchange-coupled multilayers $[Co/Pd]_5$-/NiFe and $[Co/Ni]_4$-NiFe with strong perpendicular magnetic anisotropy have been proposed to use in spin-torque switching and oscillators devices with tilted fixed and free layer to improve their functional performance. We present an experimental study of the magnetization behavior of $[Co/Pd]_5$-/NiFe and $[Co/Ni]_4$-NiFe multilayers measured using magnetometry, magnetic force microscopy (MFM) and ferromagnetic resonance (FMR) as a function of the thickness of the top NiFe layer. We varied the thickness of the NiFe layer in $[Co/Pd]_5$-NiFe (t), t = 0 - 80 nm and $[Co/Ni]_4$-NiFe (t), t = 0.5 - 2.5 nm in order to study the interplay between perpendicular magnetization of the Co/Pd or Co/Ni multilayers and in-plane magnetization of the NiFe. Our magnetometry and FMR data suggest that the $[Co/Ni]_4$/NiFe multilayer behaves like a homogeneous ferromagnetic film with anisotropy that reorients towards in-plane as the NiFe thickness increases, whereas the $[Co/Pd]_5$/NiFe multilayer reveals more complex behavior in which the [Co/Pd] layer retains out-of-plane anisotropy while the magnetization of NiFe layer tilts in-plane with increasing thickness. MFM showed that domains with $\sim$0.1 $\pm$m size were visible in [Co/Pd]-/NiFe with NiFe thickness of 20-80 nm. Multilayers were patterned into sub-100 nm dots using ion beam etching and their magnetization behavior are compared with unpatterned films.

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