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Magnetic configuration in antiferromagnetically coupled [Co/Pd]$_{15}$/TbFeCo with out-of-plane anisotropy S.M. WATSON, J.A. BORCHERS, NIST, T. HAUET, S. MANGIN, Nancy University, E.E. FULLERTON, Hitachi Global Storage Technologies — We have used Polarized Neutron Reflectometry (PNR) to investigate the magnetic properties of an exchange-coupled bilayer system with out-of-plane magnetization. These systems show potential for increasing storage densities in magnetic recording media. Magnetization measurements suggest the formation of an in-plane domain wall. The magnetic configuration inside such systems results from the competition between the magnetic field, short-range exchange coupling, and long-range dipolar interactions. This study involved [Co(0.5 nm)/Pd(X)]$_{15}$/TbFeCo(25 nm) (X=3.5, 5, 7 nm) structures. Both the [Co/Pd] and TbFeCo exhibit strong out-of-plane anisotropy and are exchange coupled antiferromagnetically due to the TbFeCo alloy concentration. The magnitude of exchange coupling between the Co layers may be modified by changing the Pd thickness. PNR measurements, which are sensitive to the in-plane component of the magnetization only, confirm the formation of an in-plane domain wall that varies with the exchange stiffness inside the Co/Pd and with the field. The extent of the in-plane domain wall decreases with increasing applied field for the films with Pd thicknesses of 7 and 5 nm whereas the behaviour of the thinnest film (Pd = 3.5nm) suggests the Co/Pd bilayers show no evidence of a domain wall.

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