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Isothermal tuning of magnetic coercivity in NiFe/NiO/[Co/Pt] heterostructures with orthogonal easy axes ANDREW BARUTH, Department of Physics, Creighton University — Heterostructures of NiFe/NiO/[Co/Pt] with mutually orthogonal easy axes allow for isothermal tuning of the magnetic coercivity at room temperature with no associated shift in the hysteresis loop along the applied field axis. This is in contrast to what is typically seen in exchange biased heterostructures. The application of moderate dc magnetic fields of <3 kOe enhances the NiFe coercivity from 14.5 to 105 Oe. The application of a similarly sized dc magnetic field perpendicular to the film completely resets this enhancement back to 14.5 Oe. We propose that the in-plane magnetization of both the NiFe and [Co/Pt] adjacent layers greatly influences the pinning of the antiferromagnetic NiO interlayer (with a blocking temperature expected to be well below 50 K at this thickness). In addition, these heterostructures show unique high and low-field training effects due to alignment of [Co/Pt] stripe domains during field cycling. The dynamic, yet predictable, behavior of isothermally tuning the magnetic coercivity without any permanent structural/chemical modifications has potential uses in advanced magnetic logic/storage, as well as tuning the interfacial coupling in spintronic applications.

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