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Isothermal electric field-tuning of Exchange bias training in Cr_2O_3/PdCo[1] WILL ECHTENKAMP, CHRISTIAN BINEK, University of Nebraska-Lincoln — Voltage-controlled exchange bias (EB) is investigated in a Cr_2O_3/PdCo EB heterosystem where a ferromagnetic and perpendicular anisotropic Pd/Co multilayer has been deposited on a (0001) Cr_2O_3 (chromia) single crystal. The EB of the system arises from chromia's electrically controllable boundary magnetization (BM) which is switched isothermally and at room temperature by magnetoelectric means [1]. The BM couples to the bulk AF order parameter and follows the latter during switching. In the work reported here, we electrically and isothermally tune chromia into distinct AF multi-domain states. As a result, exchange bias training, which originates from triggered rearrangements of the AF domain state of the pinning system during consecutively cycled hysteresis loops, can be tuned in a controlled manner between zero and sizable effects. We quantify the training effect through best fits of our Landau-Khalatnikov analytic expression [2] to the EB vs loop number. The electric field dependence of the fitting parameters is interpreted in terms of the hysteretic E-field dependence of the AF order parameter.

[1] Xi He, et al., Nature Mater.9, 579–585 (2010).
[2] Ch. Binek, Phys. Rev. B. 70, 014421 (2004).

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