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Eliminating leakage current in voltage-controlled exchange-bias devices[1] ATHER MAHMOOD, WILL ECHTENKAMP , MICHAEL STREET, CHRISTIAN BINEK, Univ of Nebraska - Lincoln, MAGNETIC HETEROSTRUCTURES TEAM — Manipulation of magnetism by electric field has drawn much attention due to the technological importance for low-power devices, and for understanding fundamental magnetoelectric phenomena. A manifestation of electrically controlled magnetism is voltage control of exchange bias (EB). Robust isothermal voltage control of EB was demonstrated near room temperature using a heterostructure of Co/Pd thin film and an exchange coupled single crystal of the antiferromagnetic Cr_2O_3 (Chromia) [1,2]. A major obstacle for EB in lithographically patterned Chromia based thin-film devices is to minimize the leakage currents at high electric fields (>10 kV/mm). By combining electrical measurements on patterned devices and conductive Atomic Force Microscopy of Chromia thin-films, we investigate the defects which form conducting paths impeding the application of sufficient voltage for demonstrating the isothermal EB switching in thin film heterostructures. Technological challenges in the device fabrication will be discussed. [1] Xi He, *et.al*, Nat. Mater. 9, 579-585 (2010) [2] W. Echtenkamp, Ch. Binek, Phys. Rev. Lett. 111, 187204 (2013)

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