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Electric-field control of magnetization in (Co(t)/Pt)n/Pb(Mg1/3Nb2/3)1-xTixO3 multiferroic heterostructures YING SUN, YONGGANG ZHAO, AITIAN CHEN, YAN LIU, Department of Physics, Tsinghua University, Beijing 100084, China, LVKUAN ZOU, XIAOLI ZHENG, QINTONG ZHANG, JIANWANG CAI, XIUFENG HAN, Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China, WENBO WANG, WEIDA WU, Department of Physics and Astronomy, Rutgers University, Piscataway, New Jersey 08854, USA — A promising way to control magnetism via electric fields is using the converse magnetoelectric effect(CME) in heterostructures composed of ferromagnetic and ferroelectric materials. So far there are few reports on electric-field (E) control of magnetic materials with perpendicular magnetic anisotropy(PMA) which is important in information storage because of its high density and thermostability. In this work, we have systematically studied the CME in heterostructures formed by growing (Co(t)/Pt)n multilayers with different Co thicknesses and n on (011)-orientated ferroelectric Pb(Mg1/3Nb2/3)1-xTixO3 substrates. By tuning Co thickness to the vicinity of the spin reorientation critical thickness, samples with PMA, in-plane magnetic anisotropy and crossover were obtained. They showed dramatic different behaviors of E control of magnetization. The results can be understood by considering the interaction between the piezostrain induced magnetic anisotropy and Co thickness-dependent magnetic anisotropy.

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