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Electric-field control of magnetization in $Co_{40}Fe_{40}B_{20}$/ $Pb(Mg_{1/3}Nb_{2/3})_{0.7}Ti_{0.3}O_3$ structure at room temperature[1] SEN ZHANG, Y.G. ZHAO, Department of Physics, Tsinghua University, Beijing 100084, China, S. RIZWAN, X.F. HAN, Beijing National Laboratory for Condensed Matter Physics, Chinese Academy of Sciences, Beijing 100190, China, J.X. ZHANG, R. RAMESH, Department of Materials Science and Engineering, University of California, Berkeley, California 94720, USA — Electric-field control of magnetization is important for new generation information storage technology with high integration density and low power consumption. A lot of work has been carried out on electric-field control of magnetization in artificial ferromagnetic-ferroelectric (FM-FE) two-phase systems via the piezo-strain effect. Beside strain, electric/elastic domains and phase structure also play important roles in the electric-field control of magnetization, especially in the case of amorphous FM film without magnetocrystalline anisotropy. We report a large magnetoelectric effect in a $Co_{40}Fe_{40}B_{20}/Pb(Mg_{1/3}Nb_{2/3})_{0.7}Ti_{0.3}O_3$ structure at room temperature. Investigations on the ferroelectric domains, phase structures, magnetic domains and strain with *in situ* electric fields reveal a new mechanism for electric-field control of magnetization. This work provides a new way to realize large magnetoelectric coupling and is significant for applications, especially in the field of CoFeB-based spin valves to achieve electric-controlled magnetic random access memories.

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