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Enhancement of Magnetoelectric Coupling in $CoGa_xFe_{2-x}O_4/BaTiO_3$ Composite[1] YAN NI, ZHEN ZHANG, DAVID JILES, Department of Electrical and Computer Engineering, Iowa State University, CAJETAN NLEBEDIM, Ames Laboratory, U.S. Department of Energy — Multiferroic materials exhibit magnetoelectric coupling and promise new device applications including magnetic sensors, generators and filters. An effective method for developing magnetoelectric (ME) materials with enhanced ME effect is achieved by the coupling through the interfacial strain between piezoelectric and magnetostrictive materials. In this study, enhancement of magnetoelectric coupling was found by systematically studying the electrical and magnetic properties of $CoGa_xFe_{2-x}O_4/BaTiO_3$ composite. It is found that Ga doping not only stabilizes the magnetic phase of composites but also increases the sensitivity of magnetoelastic response by 30%. Moreover, Ga doping reduces the electrical conductivity and the dielectric loss of composite. An enhancement of the electrostrain with doping Ga is also observed in $CoGa_xFe_{2-x}O_4/BaTiO_3$ (x=0.3). As both the sensitivity of magnetostriction and the change in the electric field with strain increase, the ME voltage coefficient also increase. Thus, our work is beneficial for the application of $CoFe_2O_4/BaTiO_3$-based multiferroic materials.

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