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The effect of structural and chemical perturbations in multiferroic $BiFeO_3$ epitaxial films[1] DAE HO KIM, H.N. LEE, M. VARELA, H.M. CHRISTEN, Mat. Sci. and Tech. Div., Oak Ridge Nat. Lab., Oak Ridge, TN, M.D. BIEGALSKI, Center for Nanophase Mat. Sci., Oak Ridge Nat. Lab., Oak Ridge, TN, C.J. CALLENDER, D.P. NORTON, Dept. of Mat. Sci. & Engr., Univ. of Florida, Gainesville, FL — The compatibility between the lone-pair driven ferroelectric distortion and antiferromagnetic order in $BiFeO_3$ attracts a lot of attention. A detailed understanding of ferroelectric properties in $BiFeO_3$ is gained by investigating the effect of structural/chemical perturbations in strained epitaxial films with chemical modifications. Our work shows that the ferroelectric polarization along [111] exhibits weak dependency on epitaxial strain on a (001) substrate. To examine the role of distortions induced by magnetic ions, we have grown $BiFe_{1-x}Cr_xO_3$ epitaxial films and observed a ferroelectric to antiferroelectric transition with increasing the Cr content. Furthermore, epitaxial films of $Bi_{1-y}Ba_yFeO_3$ were grown to investigate the effect of structural variation in connection with change in the valence of Fe ion. The results reveal a high stability of the ferroelectric distortion in epitaxial $BiFeO_3$ films.

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Dae Ho Kim
Oak Ridge National Laboratory

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