

Abstract Submitted
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Substrate and crystal orientation dependent structural and ferroelectric properties of Sm doped BiFeO₃ thin films at the morphotropic phase boundary DAISUKE KAN, University of Maryland, VALANOOR NAGARAJAN, University of New South Wales, ICHIRO TAKEUCHI, University of Maryland — Previously, we had reported on the universal trend in structural transition in rare-earth-doped BiFeO₃ films grown on (100) SrTiO₃ substrates [1]. At this boundary, we observe double hysteresis loops in PE hysteresis loops due to an electric-field-induced transition and substantial enhancement in dielectric constant and piezoelectric coefficient. In this study, we have investigated substrate dependence of the structural and ferroelectric properties of (Bi,Sm)FeO₃ by growing the composition spreads on various substrates. We chose (100), (110) and (111) SrTiO₃, (100) LSAT and (110) DyScO₃ as substrates. Scanning x-ray diffraction reveals that all the fabricated spread films exhibit the rhombohedral to orthorhombic structural transition at Sm 14%, independent on the type of the substrates. This confirms that the observed structural transition is a bulk property of the (Bi,Sm)FeO₃ system. The detailed correlations between the structural properties and ferroelectric properties depending on the type of the substrate will be discussed. This work is supported by DMR, NSF MRSEC DMR, ARO and the W. M. Keck Foundation.

[1] S. Fujino et al., APL 92, 202904 (2008).

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