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Fabrication and characterization of ferroelectric-ferromagnetic heterostructures BZT-BCT/LSMO/LAO using pulsed laser deposition MD ABDULLAH AL MAMUN, ANTHONY PELTON, BITHI PAUL, MAHMUD REAZ, HARIBHAU GHOLAP, KARTIK GHOSH, Missouri State Univ — We report multiferroic properties of ferroelectric-ferromagnetic(FE-FM) heterostructures using lead-free perovskite oxides $0.5Ba(Zr_{0.2}Ti_{0.8})O_3$-$0.5(Ba_{0.7}Ca_{0.3})TiO_3$(0.5BZT-0.5BCT) and $La_{0.7}Sr_{0.3}MnO_3$(LSMO). The heterostructures 0.5BZT-0.5BCT/LSMO/LAO were fabricated by PLD. The epitaxial nature of the films has been established through XRD. The observation of only (00l) peaks in the theta-2theta scan and small FWHM (0.11 degree) of the rocking curve performed at (002) peak indicates the quality of out-of-plane alignment and the phi-scan provides the in-plane orientation. The polarization switching has been observed with a remnant polarization of $5C/cm^2$ and coercive field of 170kv/cm. A well-behaved room temperature M-H hysteresis loop has been observed for LSMO and 0.5BZT-0.5BCT/LSMO films indicating the room temperature ferromagnetic behavior. Temperature-dependent magnetization of the films showed a paramagnetic to FM transition at about 360 K, which agrees with the literature. Also, ferromagnetic resonance data support the static magnetization data obtained using SQUID magnetometer. This work is supported by AFRL.

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