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Growth and Characterization of the Multiferroic Barium Transition Metal Fluorides $BaMF_4$ ¹ TRENT JOHNSON, PAVEL BORISOV, DAVID LEDERMAN, West Virginia University, WVU THIN FILM DEPOSITION LAB COLLABORATION — We have investigated the temperature dependent growth, as well as the magnetic and ferroelectric properties of thin films of the isostructural compounds $BaMF_4$, where $M = Fe, Co, Ni$. The films were grown by molecular beam epitaxy to thicknesses of 50 or 100 nm on single crystal Al_2O_3 (0001) substrates. X-ray diffraction shows that this family of films grow epitaxially in the (010) orientation, but are twinned in the plane, with three domain orientations rotated by 120° relative to one another. Measurements of the remanent hysteresis via interdigitated electrodes show that the compounds $M = Co$, and Ni are ferroelectric, but no switching behavior was observed in the Fe system at electric fields up to 400 kV/cm. Measurements of the field-cooled and zero-field-cooled magnetic moment confirm the existence of low temperature magnetic behavior.

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