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Characterization of multiferroic $BiFeO_3$ synthesized by RF magnetron sputtering[1] GREGORY SPENCER, RYE JOHNSON, ANUP BANDYOPADHYAY, Texas State University — Bismuth ferrite is a material which exhibits multiferroic behavior including the simultaneous appearance of both ferroelectric and antiferromagnetic properties. It is of great practical interest for device applications because of its relatively high ferroelectric Curie temperature ($T_C \sim 1100$ K) and high Neel temperature ($T_N \sim 643$ K) which are both well above room temperature. $BiFeO_3$ (BFO) has been synthesized by a variety of methods including MBE, pulsed laser deposition, and sputtering. We report on the synthesis and characterization of thin BFO thins by RF sputter deposition onto an STO/Si substrate at temperatures from 400° C to 600° C. The resulting polycrystalline films, ranging in thickness from $\sim$ 80 to 200 nm, were characterized by X-ray diffraction to determine the crystallinity. We have also measured the magnetic behavior by vibrating sample magnetometer as a function of temperature between 4K and 300K. Imaging and EDS by SEM was performed to study the film morphology as well as AFM imaging. The SEM images revealed structures that formed spontaneously during the thicker film depositions. These results and comparison with others will be presented.

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