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Synthesis and characterization of multiferroic Bismuth Ferrite nanoparticles MAHESHIKA PALIHAWADANA ARACHCHIGE, RAJESH REGMI, GAVIN LAWES, Wayne State University — In recent years, there has been considerable research in multiferroics, materials that exhibit more than one of ferroelectric, ferromagnetic and ferroelastic properties simultaneously. $BiFeO_3$, as one of the very few mutiferroics with a simultaneous coexistence of ferroelectric and antiferromagnetic at room temperature, is among the most intensely studied and promising multiferroics. It has a rhombohedrally distorted pervokite structure and exhibits antiferromagnetic ordering with Neel temperature of about 643 K and ferroelectric properties below approximately 1123 K. We synthesized $BiFeO_3$ nanoparticles having a diameter of roughly 14 nm using a ferrioxalate precursor method and characterized their structure using X-ray diffraction and Raman spectroscopy. Using room temperature magnetization data, we find that the saturation magnetization is close to 0.5 emu/cm^3. We also measured the temperature dependent magnetization, both zero field cooled and field cooled, and found that the blocking temperature is 116 K, which is slightly higher than the value reported for similar BiFeO3 nanoparticles. Dielectric measurements show a broad anomaly near 275 K, which consistent with observations on bulk $BiFeO_3$, although a second anomaly found in bulk samples near 25 K is not present in our data.

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