Contribution ID: **87** Type: **Poster**

Magnetodielectric coupling in pure and Dy-doped BiFeO3 nanoparticles

Multiferroics invite intensive research from last decade because of their extensive range of interesting applications in high density data-storage systems, magnetoelectric sensors, multiple-state memories, nanoelectronics, spintronics. Bismuth ferrite (BiFeO3), which is widely studied due to large coupling between electric and magnetic orders at room temperature, is promising for above said device applications. The existing literature does not shed clear light on what is going on with the crystal structure and ferroelectric, magnetic and magnetodielectric properties upon doping of BiFeO3 with Dy. In this work, pure and Dy-doped BiFeO3 nanoparticles synthesized by sol-gel method have been studied. This study establishes that strong magnetoelectric coupling in BiFeO3 nanoparticles may be achieved with doping, and Dy-doped BiFeO3 nanoparticles may prove to be useful in the development of nanoscale multiferroic-based devices.

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Track Classification: Physics of Magnetism