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**Crystal structure and multiferroic properties of the 0.7($BaTiO_3$) – 0.3($Bi_{0.45}Dy_{0.55}FeO_3$) ceramic composite** RICARDO MARTINEZ, NORA ORTEGA, ASHOK KUMAR, RATNAKAR PALAI, RAM S. KATIYAR, University of Puerto Rico — Magnetoelectric multiferroics are a novel class of next generation multifunctional materials. Intensive research is being pursued towards the development of new room temperature multiferroics with strong magnetoelectric (ME) coupling. $BaTiO_3$(BT) is well known ferroelectric and $Bi_{0.45}Dy_{0.55}FeO_3$(BDFO) is multiferroic in nature with weak ferroelectric properties. We have synthesized lead free ceramic composite consisting of 0.7BT–0.3BDFO (BT-BDFO) by conventional solid state. X-ray diffraction and Raman analysis revealed two sets of peaks which belong to BT and BDFO suggesting that the individual phases are retained in the composite ceramic, no additional peaks were observed. The presence of ferromagnetic and ferroelectric hysteresis loops at room temperature ($M_s$=14.3 emu/cm$^3$, $M_r$=1.7 emu/cm$^3$, $P_r$=3.6 $\mu$C/cm$^2$ and $E_c$=1.7 kV/cm) showed multiferroic nature of the BT-BDFO ceramic. Although the polarization and magnetization values obtained were lower compared with pure $BaTiO_3$and BDFO respectively, magnetodielectric measurements reveled a shifting of the dielectric constant peak from 2 MHz to 4 MHz with increase of magnetic field from 0 T to 2 T.

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