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| Title | Enhancement of electrical and magnetodielectric properties of BiFeO3 incorporated PVDF flexible nanocomposite films | | |
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| Abstract: Polyvinylidene fluoride (PVDF) with bismuth ferrite (BiFeO3) (BFO) flexible nanocomposite films by varying the concentration of BFO nanoparticles are successfully synthesized by in situ sol-gel process. X-ray diffraction (XRD) pattern confirmed the phase purity of BFO nanoparticles and different crystalline phases of PVDF in PVDF-BFO nanocomposites. The average particle size of BFO nanoparticles is estimated as 34 nm from the fitting of the log-normal distribution function with particle distribution pattern obtained from the transmission electron microscopy (TEM) image analysis. The frequency dependence of ac conductivity confirmed the correlated barrier hopping (CBH) conduction mechanism follows by charge carriers in nanocomposites. The higher value of dielectric permittivity is observed in nanocomposite due to the increase of dipole-dipole interaction at the interface of PVDF and BFO by increasing the BFO concentration. The room temperature M-H and P-E hysteresis loop confirmed the nanocomposites exhibit both magnetic and ferroelectric ordering at the room temperature. The energy storage density of the nanocomposites is increasing with the concentration of BFO nanoparticles. Variation of room temperature magnetodielectric coupling confirmed the multiferroic nature exist in PVDF-BFO nanocomposites, which can be more useful in flexible electronics, energy storage or spintronics devices in multifunctional area. |  |
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