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| Title | Electrical and Magnetic Properties of Polyvinyl Alcohol-Cobalt Ferrite Nanocomposite Films | | |
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| Abstract: Polyvinyl alcohol (PVA)–cobalt ferrite (CFO) nanocomposite films were synthesized by wet chemical method. The synthesized CFO nanomaterial was characterized by X-ray diffraction (XRD) and transmission electron microscopy (TEM), which confirm the formation of pure phase nanoparticles with cuboid shape. The variation in AC conductivity is measured as a function of frequency (within the range of 100 Hz–1 MHz) and temperature (from 303 to 403 K). It was observed that the frequency exponent, S, decreases with increasing temperature, which is explained by correlated barrier hopping (CBH) conduction mechanism. Frequency dependence of real and imaginary parts of the dielectric permittivity of PVA–CFO nanocomposite films for different temperatures is studied on the basis of the modified Cole–Cole model. The dielectric permittivity of the samples reveals an increasing tendency with the concentration of CFO filler in PVA matrix. A high value of 89 emu.g-1 saturation magnetization and 652 Oe coercivity are observed in CFO nanoparticle. The coercivity increased in PVA–CFO nanocomposite when compared to CFO nanoparticle, which is expected due to inverse magnetostrictive effect. The increasing tendency of dielectric constant and magnetization of the nanocomposites with the increasing CFO concentration enhances the potential of applications in miniaturization of the antenna system and electromagnetic shielding materials. |  |
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