ABSTRACT

Perovskites compounds prepared in the nanoscale have recently gained extensive attention due to their electrochemical, photocatalytic, and photovoltaics applications. This research work emphasizes the intrinsic properties of double perovskite and describes the crystallographic, surface morphology, and dielectric properties of double oxide perovskites. Different samples having formula A_2FeMnO_6 (A= Ba, La, Ce, and Sr) have been synthesized by a hydrothermal process with sintering temperature at 800° C for 6 hours. The structure was examined by the X-ray diffraction spectroscopy (XRD). The XRD patterns verify the formation of the cubic and orthorhombic perovskite structure with F3-mm, Pbnm space group respectively, which is persistent with the standard data. The lattice parameters were calculated through Rietveld refinement and all the parameters show the decrease in the cell volume for all the samples as compared to the standard data. This is due to the replacement of A-site cation with Ba, La, and Ce, respectively. The surface morphology of the samples was examined by the field emission Scanning electron microscope. The average particle size of all the samples lies in the range of 500-550 nm. The Fourier transform infrared (FTIR) spectroscopy shows the formation of functional bonding in all samples at 500-600 cm^{-1}. The Electrical impedance spectroscopy (EIS) was used to observe the polarization behavior of the studied samples in the microwave region. The dielectric constant, dielectric loss and complex impedance of the samples were calculated. The impedance spectroscopy studies reveal the presence of orientational polarization in the samples at low frequency range.