

Characterization and study of the dielectric properties of the BaBi₄Ti₄O₁₅ (BBT) matrix with additions of Nb₂O₅ for radio frequency applications

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BaBi₄Ti₄O₁₅ ceramic (BBT), perovskite-type of the Aurivillius family that has a wide range of applications in non-volatile ferroelectric memory devices (Fe-RAM), piezoelectric transducers, sensors [1-3]. In the work, BBT was prepared by solid-state reaction method then Nb₂O₅ were added into BBT with following weight percentages 1%, 2%, 5% and 10%. X-ray diffraction analysis (XRD) showed that there was no formation of secondary phases after the addition of Nb₂O₅.

Complex impedance spectroscopy was performed where dielectric constant (ϵ') and dielectric loss tangent ($\tan \delta$) were measured at room temperature over a range of 100 Hz – 10 MHz as well as alternate current conductivity showing interesting properties, such as high value of dielectric constant for production of capacitive devices. Results obtained demonstrated that BBT-Nb₂O₅ could be employed in devices that operate in radiofrequency.

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