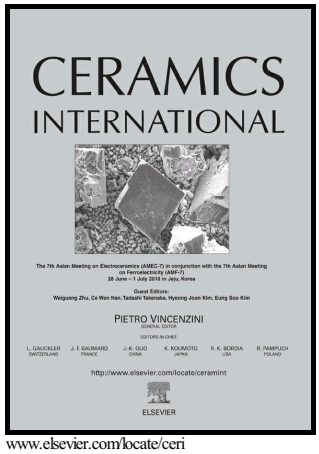

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V.L. Vilesh, G. Subodh

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Crystal Structure, Phonon Modes and Dielectric Properties of B Site Ordered $ABiLiTeO_6$ (A = Ba, Sr) Double Perovskites

Vilesh V. L., Subodh G.*

Department of Physics, University of Kerala, Thriruvananthapuram-695581, Kerala, India
*E- Mail: gsubodh@gmail.com

Abstract

$ABiLiTeO_6$ (A = Ba, Sr) double perovskite oxides were synthesised through conventional solid - state ceramic route. X-Ray diffraction patterns indicated pseudocubic symmetry for both compounds. Deconvoluted Raman spectra using Lorentzian function gave 7 first order Raman modes for both $BaBiLiTeO_6$ and $SrBiLiTeO_6$ whereas Infrared spectroscopy gave 8 modes for $BaBiLiTeO_6$ and 9 modes for $SrBiLiTeO_6$. Observed phonon modes were in good agreement with the corresponding group theoretical predictions for space group *I4/m* for both compounds. Rietveld refinement of the XRD patterns also confirmed *I4/m* space group for $ABiLiTeO_6$ (A = Ba, Sr) with 1:1 B site ordering of Te^{6+} and Li^{+} cations. The random occupancy of Ba^{2+} and Bi^{3+} at the A site in $BaBiLiTeO_6$ whereas Sr^{2+} and Bi^{3+} in $SrBiLiTeO_6$ were revealed from Rietveld refinement. Microstructure of both the compounds gave average grain size of less than 3 μm. At 1 MHz, $BaBiLiTeO_6$ and $SrBiLiTeO_6$ possess porosity corrected dielectric constants of 49.5 and 34.4 and dielectric losses of 0.029 and 0.028 respectively.

Keywords: Double Perovskite, Cation Ordering, Raman Spectra, Dielectric properties.