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Ionic conductivity studies of $La_{0.55}Li_{0.40}ZrO_{3-\delta}$ and Zr doped $La_{0.55}Li_{0.40}TiO_{3-\delta}$

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Abstract. We report the synthesis and conductivity properties of $La_{0.55}Li_{0.40}ZrO_{3-\delta}$ and Zr doped $La_{0.55}Li_{0.40}Ti_{0.9}Zr_{0.1}O_{3-\delta}$ perovskite oxide. X-ray diffraction (XRD) pattern shows the orthorhombic perovskite structure for $La_{0.55}Li_{0.40}ZrO_{3-\delta}$ and $La_{0.55}Li_{0.40}Ti_{0.9}Zr_{0.1}O_{3-\delta}$. Conductivity has been found increased with the increase in temperature and frequency in both the compositions. $La_{0.55}Li_{0.40}ZrO_{3-\delta}$ shows 1.04 x 10^{-2} S/cm conductivity at room temperature (25^{o}C) which increases upto maximum 5.1 x 10^{-2} S/cm for 300^{o}C. $La_{0.55}Li_{0.40}TiO_{3-\delta}$ shows maximum conductivity 2.5 x 10^{-3} S/cm at room temperature (25^{o}C). $La_{0.55}Li_{0.40}Ti_{0.9}Zr_{0.1}O_{3-\delta}$ shows maximum conductivity 7.21 x 10^{-3} S/cm at room temperature. This is the first report of synthesis of single phase of $La_{0.55}Li_{0.40}ZrO_{3-\delta}$ oxide and this material shows high conductivity from room temperature to temperature 450 ^{o}C.

Keywords: Ceramics, Conductivity; High temperature synthesis; Impedance; Cole-Cole plots

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