

# IONIC CONDUCTIVITY BEHAVIOR OF LITHIUM SULFATE DOPED TRANSITION METAL OXIDE GLASSES

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## ABSTRACT

Novel lithium ion containing transition metal oxide based phosphate glasses have been synthesized in the composition  $x\text{Li}_2\text{SO}_4\text{-}30\text{Li}_2\text{O}\text{-(}70\text{-}x\text{) [}0.70\text{P}_2\text{O}_5\text{:}0.30\text{V}_2\text{O}_5\text{]}$  ( $x=5, 10, 15, 20$  and  $25$  mol %). Glasses are synthesized using melt quenching technique and their amorphous nature is tested by XRD studies. Impedance measurements are carried out in the frequency range of 100Hz-11MHz over and a temperature range of 313 K to 463 K. Impedance and modulus formalism is employed to study ion transport behavior of as-prepared glasses. Activation energies ( $E_{dc}$ ) and d.c conductivities ( $\sigma_{dc}$ ) exhibit composition dependent trends. Impedance and modulus formalism reveals dominance of ion conductivity and relaxation mechanism of  $\text{Li}^+$  ions in the investigated glasses are of short range and of non-Debyetype.

**Keywords:** Lithium ion, ion conductivity, impedance formalism, transition metal

