

## **A comparative study on ionic conductivity of Sr and Mg stabilized zirconia by impedance spectroscopy**

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### **Abstract**

The high ionic conductivity of stabilized zirconia materials are materials of outstanding technological importance. The stabilization have been done by substitutional doping of lower valent metal oxides (MgO, SrO, CaO, Y<sub>2</sub>O<sub>3</sub>, Sc<sub>2</sub>O<sub>3</sub> etc.,). The Mg and Sr stabilized Zirconia have been synthesized by co-precipitation method. The formation of the compound has been confirmed from XRD analysis. The particle size has been calculated from the XRD analysis and is found to be in the order of nm. The electrical characterization is carried out using the Impedance spectroscopy method in the frequency range of 50 Hz to 5 MHz. The conductance spectra show the dc plateau and dispersive region. The dispersive region suggests the correlated hopping motion of ions. The charge carrier concentration is found to be higher for Mg stabilized zirconia rather than for Sr stabilized zirconia. The bulk resistance for Sr and Mg stabilized zirconia has been found to be in the order of  $3.47 \times 10^7 \text{ W cm}^{-1}$  and  $5.05 \times 10^5 \text{ W cm}^{-1}$ . The low frequency dispersion of the dielectric spectra for both the samples implies the space charge effects arising from the electrodes. Key words: Stabilized zirconia, XRD analysis, Ionic conductivity,