

## Preparation, Characterization and Ionic Conductivity of (1-x) (CdI<sub>2</sub>-Ag<sub>2</sub>CrO<sub>4</sub>)-(x) Al<sub>2</sub>O<sub>3</sub> Composite Solid Electrolytes

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**Abstract :** Composite solid electrolyte of the salt and oxide type is an effective approach to improve the ionic conductivity in low and intermediate temperature regions. The conductivity enhancement in the composites occurs via interfaces. Because of their high ionic conduction, composite electrolytes have wide applications in different electrochemical devices such as solid-state batteries, solid oxide fuel cells, and electrochemical cells. In this work, a series of novel (1-x) (CdI<sub>2</sub>-Ag<sub>2</sub>CrO<sub>4</sub>)-xAl<sub>2</sub>O<sub>3</sub> composite solid electrolytes has been synthesized. The prepared materials were characterized by X-ray diffraction, differential thermal analysis, and AC impedance spectroscopy. The impedance spectra show single semicircle representing the simultaneous contribution of grain and grain boundary. The conductivity increased with the increase of Al<sub>2</sub>O<sub>3</sub> content and shows the maximum conductivity ( $\sigma = 0.0012 \text{ S cm}^{-1}$ ) for 30% of Al<sub>2</sub>O<sub>3</sub> content at 30 °C.

**Keywords :** composite solid electrolyte, X-ray diffraction, Impedance spectroscopy, ionic conductivity

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