Short Communication

Characterization and Electrochemical Properties of 10 mol% Lutetium-Doped BaCO₃ and its Composite Electrolyte for Intermediate Temperature Fuel Cells

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In this study, BaCe_{0.9}Lu_{0.1}O_{3-α} was prepared by a sol-gel method. Subsequently, it was combined with molten carbonates and chlorides to synthesize BaCe_{0.9}Lu_{0.1}O_{3-α}-(Na/K)Cl-(K/Li)₂CO₃ composite electrolyte. Structural characterizations and intermediate temperature electrochemical properties of BaCe_{0.9}Lu_{0.1}O_{3-α} and BaCe_{0.9}Lu_{0.1}O_{3-α}-(Na/K)Cl-(K/Li)₂CO₃ were investigated at 400–700 °C. X-ray diffraction showed that the main structure of BaCe_{0.9}Lu_{0.1}O_{3-α}-(Na/K)Cl-(K/Li)₂CO₃ was BaCeO₃ phase. The highest conductivity of BaCe_{0.9}Lu_{0.1}O_{3-α}-(Na/K)Cl-(K/Li)₂CO₃ was 6.8×10⁻² S·cm⁻¹ at 700 °C.

Keywords: Defects; Electrolytes; Fuel cell; Conductivity; Composite

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