Short Communication

Synthesis and Electrochemical Properties of Intermediate Temperature $\text{SrCe}_{0.6}\text{Zr}_{0.3}\text{Er}_{0.1}\text{O}_{3-\alpha}$ -molten Carbonate Composite Electrolyte

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An erbium-doped $\text{SrCeO}_3/\text{SrZrO}_3$ electrolyte was synthesized via a sol-gel method using zirconium nitrate, cerium nitrate, strontium nitrate, nitric acid, citric acid and erbium oxide as raw materials. And $\text{SrCe}_{0.6}\text{Zr}_{0.3}\text{Er}_{0.1}\text{O}_{3-\alpha}$ -molten carbonate composite electrolyte was obtained at a low synthesis temperature. The thermal gravimetry analysis-differential scanning calorimetry (TGA-DSC) was tested to determine the formation temperature of $\text{SrCeO}_3/\text{SrZrO}_3$ solid solution phase. The structure (X-ray diffractometer, XRD), morphology (scanning electron microscope, SEM), conductivities and H_2/O_2 fuel cells of $\text{SrCe}_{0.6}\text{Zr}_{0.3}\text{Er}_{0.1}\text{O}_{3-\alpha}$ and $\text{SrCe}_{0.6}\text{Zr}_{0.3}\text{Er}_{0.1}\text{O}_{3-\alpha}\text{-Na}_2\text{CO}_3\text{-Li}_2\text{CO}_3$ were studied at 400-600 °C. The highest power densities of $\text{SrCe}_{0.6}\text{Zr}_{0.3}\text{Er}_{0.1}\text{O}_{3-\alpha}$ and $\text{SrCe}_{0.6}\text{Zr}_{0.3}\text{Er}_{0.1}\text{O}_{3-\alpha}\text{-Na}_2\text{CO}_3\text{-Li}_2\text{CO}_3$ were $16.3 \text{ mW}\cdot\text{cm}^{-2}$ and $247.5 \text{ mW}\cdot\text{cm}^{-2}$ at 600 °C, respectively.

Keywords: Composite; SrCeO_3 ; Electrolyte; Conductivity; Fuel cell

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