Short Communication

Novel Composite Electrolyte of Double-Doped Ceria-Sulphate for Medium Temperature Fuel Cells

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In this study, Gd^{3+} and Er^{3+} double-doped CeO_2 was synthesized by a microemulsion method. $Ce_{0.8}Er_{0.1}Gd_{0.1}O_{2-\alpha}-K_2SO_4-Li_2SO_4$ composite electrolyte was prepared by mixing $Ce_{0.8}Er_{0.1}Gd_{0.1}O_{2-\alpha}$ powder with binary sulphates. The structures of $Ce_{0.8}Er_{0.1}Gd_{0.1}O_{2-\alpha}$ and $Ce_{0.8}Er_{0.1}Gd_{0.1}O_{2-\alpha}-K_2SO_4-Li_2SO_4$ were characterized by X-ray diffraction (XRD) and Raman spectrometer. XRD spectra showed that the $Ce_{0.8}Er_{0.1}Gd_{0.1}O_{2-\alpha}$ structure was not affected by $K_2SO_4-Li_2SO_4$. Raman spectrometer further indicated that the prepared $Ce_{0.8}Er_{0.1}Gd_{0.1}O_{2-\alpha}-K_2SO_4-Li_2SO_4$ had a cubic structure of CeO_2 and the existence of SO_4^{2-} . The maximum conductivity of $Ce_{0.8}Er_{0.1}Gd_{0.1}O_{2-\alpha}-K_2SO_4-Li_2SO_4$ reached $0.21\ S\cdot cm^{-1}$ at $700\ ^\circ C$.

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

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