Short Communication

Structure Characterization and Electrical Properties of $\text{Sn}_{0.9}\text{Ga}_{0.1}\text{P}_2\text{O}_7/\text{KH}_2\text{PO}_4/\text{KPO}_3$ Composite Electrolyte for Medium Temperature Fuel Cells

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In this study, $\text{Sn}_{0.9}\text{Ga}_{0.1}\text{P}_2\text{O}_7/\text{KH}_2\text{PO}_4/\text{KPO}_3$ was synthesized by solid-phase method. The sample was characterized by Raman spectrometer and X-ray diffractometer. The ionic conductivity of $\text{Sn}_{0.9}\text{Ga}_{0.1}\text{P}_2\text{O}_7/\text{KH}_2\text{PO}_4/\text{KPO}_3$ at 400–700 °C was studied by electrochemical methods, including impedance spectroscopy, oxygen concentration discharge cell and hydrogen/oxygen fuel cell. The oxygen concentration discharge cell result showed that the sample is a pure oxygen ion conductor in an oxidizing atmosphere. The maximum current and power output density of $\text{Sn}_{0.9}\text{Ga}_{0.1}\text{P}_2\text{O}_7/\text{KH}_2\text{PO}_4/\text{KPO}_3$ are $380 \text{ mA}\cdot\text{cm}^{-2}$ and $134 \text{ mW}\cdot\text{cm}^{-2}$ at 700 °C, respectively.

Keywords: X-ray diffraction; Conductivity; Electrolyte; Fuel cell; Composite

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