Synthesis and Intermediate Temperature Electrical Properties of $\text{Zr}_{0.84}\text{Y}_{0.12}\text{Nd}_{0.04}\text{O}_{2-\alpha}$ -Low Melting Point Glass Powder Composite Electrolyte

Jitang Chen¹, Wenli Hu², Wei Chen², Qiuqing Dong¹, Chunhua Luo^{1,*}, Hongtao Wang^{1,*}

¹ School of Chemical and Material Engineering, Fuyang Normal College, Fuyang 236037, China

² Fuyang Preschool Education College, Fuyang 236015, China

*E-mail: hongtaoking3@163.com, lch197919@163.com

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In this paper, Nd^{3+} and Y^{3+} double doped ZrO_2 -low melting point glass powder (ZYN-glass) composite electrolyte was synthesized by solid-state reaction after heating at 700 °C for 6 h. XRD and SEM techniques were used to analyze the phase structures and morphologies of ZYN-glass. The $\log(\sigma T)$ based on the operating temperature of ZYN-glass was studied by means of the AC impedance at 400–800 °C. The ZYN-glass showed the highest conductivity of $4.3 \times 10^{-2} \text{ S} \cdot \text{cm}^{-1}$ at 800 °C. Oxygen concentration difference cell: air, Pd-Ag|ZYN-glass|Pd-Ag, O_2 was constructed at 400–700 °C. H_2/O_2 fuel cell: H_2 , Pd-Ag|ZYN-glass|Pd-Ag, O_2 was also tested at 800 °C.

Keywords: Conductivity; Fuel cell; Oxide ionic; Electrolyte; Composite

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