Short Communication

Intermediate Temperature Electrochemical Properties of $\text{Sn}_{0.95}\text{Ni}_{0.05}\text{P}_2\text{O}_7/\text{KPO}_3$ Composite Electrolyte

Guoquan Shao, Lili Wang, Wenjian Wang, Qingxin Guo, Hui Zhu, Jilong Ma*

Traditional Chinese Medicine College, Bozhou University, Bozhou 236800, Anhui, China

*E-mail: bxymjl2019@163.com

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In this study, a pyrophosphate-based composite electrolyte of $\text{Sn}_{0.95}\text{Ni}_{0.05}\text{P}_2\text{O}_7/\text{KPO}_3$ was prepared by a solid state method. The structure and electrical properties of the composite were studied using X-ray diffractometer, electrochemical workstation etc. XRD test showed that $\text{Sn}_{0.95}\text{Ni}_{0.05}\text{P}_2\text{O}_7$ maintains the original lattice structure and does not react with KPO_3 phase. The results show the sample was an ionic conductor in the high oxygen partial pressure range and was a mixed conductor of ions and electrons in the low oxygen partial pressure range. The highest power output density and conductivity of $\text{Sn}_{0.95}\text{Ni}_{0.05}\text{P}_2\text{O}_7/\text{KPO}_3$ were $64.2 \text{ mW} \cdot \text{cm}^{-2}$ and $2.4 \times 10^{-2} \text{ S} \cdot \text{cm}^{-1}$ at 700°C , respectively.

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

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