

[本期目录](#) | [下期目录](#) | [过刊浏览](#) | [高级检索](#)[\[打印本页\]](#) [\[关闭\]](#)

论文

中温复合固体电解质SDC-LSGM的制备和性能

徐丹, 刘晓梅, 王德军, 朱成军, 严端廷, 裴力, 苏文辉

吉林大学物理学院, 长春 130021

摘要:

采用甘氨酸-硝酸盐法分别制备了 $\text{Ce}_{0.85}\text{Sm}_{0.15}\text{O}_{2-\delta}$ (SDC)与 $\text{La}_{0.9}\text{Sr}_{0.1}\text{Ga}_{0.8}\text{Mg}_{0.2}\text{O}_{3-\delta}$ (LSGM)两种电解质材料, 并用固相混合法将两种材料按不同质量比(SDC与LSGM的质量比分别为9:1, 8:2, 5:5)混合制备复合电解质材料。采用交流阻抗技术对样品的电学性能进行研究。实验结果表明, SDC与LSGM的质量比为9:1(SL91)时, 样品具有较高的电导率, 在350—800 °C温度范围内其电导率均比SDC的高。以复合电解质为支撑体, 以 $\text{Sm}_{0.5}\text{Sr}_{0.5}\text{CoO}_3$ 为阴极、 NiO/SDC 为阳极制成单电池, 测试结果显示, 在800 °C时以SL91为电解质的单电池的最大输出功率密度为0.25 W/cm², 最大电流密度为1.06 A/cm²。在电池的工作温度区间(600—800 °C)内以复合材料为电解质的单电池的开路电压比以SDC为电解质的高。

关键词: 中温固体氧化物燃料电池 $\text{Ce}_{0.85}\text{Sm}_{0.15}\text{O}_{2-\delta}$ $\text{La}_{0.9}\text{Sr}_{0.1}\text{Ga}_{0.8}\text{Mg}_{0.2}\text{O}_{3-\delta}$ 复合电解质

Preparation and Performance of Intermediate-temperature Composite Electrolytes of SDC-LSGM

XU Dan, LIU Xiao-Mei*, WANG De-Jun, ZHU Cheng-Jun, YAN Duan-Ting, PEI Li, SU Wen-Hui

College of Physics, Jilin University, Changchun 130021, China

Abstract:

The electrolytes materials $\text{Ce}_{0.85}\text{Sm}_{0.15}\text{O}_{1.925}$ (SDC) and $\text{La}_{0.9}\text{Sr}_{0.1}\text{Ga}_{0.8}\text{Mg}_{0.2}\text{O}_{2.85}$ (LSGM) were synthesized by means of glycine-nitrate process(GNP), respectively, then the composite electrolytes were prepared by mixing SDC and LSGM(the mass ratio of SDC powder to LSGM powder are 9:1, 8:2, 5:5, respectively). Its electrical properties were investigated by impedance spectroscopy in air. The results obtained shows that when the composition was 90% SDC and 10%(mass fraction) LSGM(SL91), the electrolyte has a higher electrical conductivity in comparison to SDC in the temperature range of 350—800 °C. Electrolyte-supported solid oxide fuel cells(SOFC) was fabricated with NiO/SDC as the anode and $\text{Sm}_{0.5}\text{Sr}_{0.5}\text{CoO}_3$ as the cathode. The V - I characteristics of single fuel cell shows that the maximum output power density was 0.25 W/cm² at 800 °C and the maximum current density was 1.06 A/cm² for the cell with SL91 as the electrolyte. The open circuit voltage(OCV) of the single fuel cell using the composite as the electrolytes was higher than the cell using single SDC as the electrolyte in the working temperature range of 600—800 °C. It can be confirmed that to some extent, doping LSGM to SDC can block off the electronic current caused by the $\text{Ce}^{4+}/\text{Ce}^{3+}$ reduction process.

扩展功能

本文信息

Supporting info

[PDF\(575KB\)](#)[\[HTML全文\]\(OKB\)](#)

参考文献[PDF]

参考文献

服务与反馈

把本文推荐给朋友

加入我的书架

加入引用管理器

引用本文

Email Alert

文章反馈

浏览反馈信息

本文关键词相关文章

▶ 中温固体氧化物燃料电池

▶ $\text{Ce}_{0.85}\text{Sm}_{0.15}\text{O}_{2-\delta}$ ▶ $\text{La}_{0.9}\text{Sr}_{0.1}\text{Ga}_{0.8}\text{Mg}_{0.2}\text{O}_{3-\delta}$

▶ 复合电解质

本文作者相关文章

▶ 徐丹

▶ 刘晓梅

▶ 王德军

▶ 朱成军

▶ 严端廷

▶ 裴力

▶ 苏文辉

▶ 徐丹

▶ 刘晓梅

▶ 王德军

▶ 朱成军

▶ 严端廷

▶ 裴力

▶ 苏文辉

PubMed

Article by

Keywords: Intermediate-temperature solid oxide fuel cell $\text{Ce}_{0.85}\text{Sm}_{0.15}\text{O}_{2-\delta}$
 $\text{La}_{0.9}\text{Sr}_{0.1}\text{Ga}_{0.8}\text{Mg}_{0.2}\text{O}_{3-\delta}$ Composite electrolyte

Article by
Article by
Article by
Article by
Article by

收稿日期 2007-12-18 修回日期 1900-01-01 网络版发布日期

DOI:

基金项目:

通讯作者: 刘晓梅

作者简介:

参考文献:

1. Minh N. Q., J. Am. Ceram. Soc.[J], 1993, 76(3): 563—588
2. Ishihara T., Matsuda H., Takita Y., J. Am. Chem. Soc.[J], 1994, 116: 3801—3803
3. Huang K., Goodenough J. B., J. Alloys Comp.[J], 2000, 303/304: 454—464
4. Zhang X., Ohara S., Okawa H., et al.. Solid State Ionics[J], 2001, 139: 145—152
5. Yamaji K., Horita T., Ishikawa M., et al.. Solid State Ionics[J], 1998, 108: 415—421
6. ZHENG Min-Zhang(郑敏章), LIU Xiao-Mei(刘晓梅), ZHU Cheng-Jun(朱成军), et al.. Chem. J. Chinese Universities(高等学校化学学报)[J], 2006, 27(11): 2030—2033
7. ZHOU De-Feng(周德凤), GUO Wei(郭微), GE Zhi-Min(葛志敏), et al.. Chem. J. Chinese Universities(高等学校化学学报)[J], 2007, 28(2): 220—223
8. Liu X., Su W., Liang L. G., et al.. J. Rare Earths[J], 2003, 21: 699—700
9. Shimonosono T., Hirata Y., Ehira Y., et al.. Solid State Ionics[J], 2004, 174: 27—33
10. Peng R., Xia C., Meng G., et al.. Materials Letters[J], 2002, 56: 1043—1047
11. Hrovat M., Ahmad-Khanlou A., Samardzija Z., et al.. Mater. Res. Bull.[J], 1999, 34: 2027—2034
12. Guo X., Waser R.. Progress in Materials Science[J], 2006, 51: 151—210

本刊中的类似文章

1. 岳瑞娟,牛艳华,王志刚 .相态结构对聚氧化乙烯/丁二腈/高氯酸锂复合电解质室温电导率的影响[J]. 高等学校化学学报, 2008,29(6): 1282-1284
2. 朱晓东,孙克宁,张乃庆,陈新兵,付强,贾德昌 .羧酸镧基中温-SOFC的新型阳极 $\text{NiO}-\text{La}_{0.3}\text{Ce}_{0.7}\text{O}_{2-\delta}$ 研究[J]. 高等学校化学学报, 2007,28(5): 824-826
3. 王金霞,姚瑛,许大鹏,苏文辉 . $\text{Ba}_{1-x}\text{Pr}_x\text{CoO}_3$ 阴极材料在中温SOFC中的应用[J]. 高等学校化学学报, 2007,28(11): 2146-2149

文章评论

序号	时间	反馈人	邮箱	标题	内容
1	2009-11-16	frsahfkjsdagjk	hsjkafh@sdk.com	ugg boots	Ugg Boots Sale Online Ugg Boots Discount Uggs Di Ugg Ugg Shoes Sa Sale Cheap Ugg Cheap Uggs ugg

Copyright 2008 by 高等学校化学学报