

研究论文

复合阴极材料 $\text{La}_{1-x}\text{Sr}_x\text{CuO}_{3-\delta}$ -SDC的制备及电学性能

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摘要 合成具有单相正交钙钛矿结构的 $\text{La}_{1-x}\text{Sr}_x\text{CuO}_{3-\delta}$ ($x=0.15, 0.2, 0.3, 0.4$)系列样品, 碘量滴定法实验结果表明, 随着Sr掺入量的增加, Cu^{3+} 离子的含量逐渐增加, 电学性能研究结果表明, $\text{La}_{0.7}\text{Sr}_{0.3}\text{CuO}_{3-\delta}$ 电导率最高, 与 $\text{La}_{0.6}\text{Sr}_{0.4}\text{CuO}_{3-\delta}$ 相比, $\text{La}_{0.7}\text{Sr}_{0.3}\text{CuO}_{3-\delta}$ 具有更好的电学性能, 可作为一种新的中温固体氧化物燃料电池(IT-SOFC)阴极材料. 将 $\text{La}_{0.7}\text{Sr}_{0.3}\text{CuO}_{3-\delta}$ 与不同质量比的中温电解质 $\text{Ce}_{0.85}\text{Sm}_{0.15}\text{O}_{2-\delta}$ (SDC)固相混合, 制备复合阴极材料, 电化学性能测试结果表明, 掺入适量的SDC有利于降低 $\text{La}_{0.7}\text{Sr}_{0.3}\text{CuO}_{3-\delta}$ 电极的极化, 获得性能更优越的IT-SOFC阴极材料, 提高在中温区单电池的输出功率.

关键词 [IT-SOFC](#) [复合阴极](#) [La_{1-x}Sr_xCuO_{3-δ}](#) [SDC](#)

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Preparation and Electrical Properties of Composite Cathode Material $\text{La}_{1-x}\text{Sr}_x\text{CuO}_{3-\delta}$ -SDC for IT-SOFCs

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Abstract The cathode material $\text{La}_{1-x}\text{Sr}_x\text{CuO}_{3-\delta}$ ($x=0.15, 0.2, 0.3, 0.4$) was synthesized by a sol-gel method. X-ray diffraction reveals that it is a single phase of perovskite. The investigation of the electrical properties suggest that $\text{La}_{0.7}\text{Sr}_{0.3}\text{CuO}_{3-\delta}$ has the highest electrical conductivity. $\text{La}_{0.7}\text{Sr}_{0.3}\text{CuO}_{3-\delta}$ powder was mixed with different amount of SDC($\text{Sm}_{0.15}\text{Ce}_{0.85}\text{O}_{1.925}$) powder(5%—30%, mass fraction) as composite cathodes. Electrochemical properties of the composite cathodes were researched further. The investigation suggests the addition of appropriate amount SDC to $\text{La}_{0.7}\text{Sr}_{0.3}\text{CuO}_{3-\delta}$ can improve the electrochemical properties, and a better cathodic performance can be obtained. Using $\text{La}_{0.7}\text{Sr}_{0.3}\text{CuO}_{3-\delta}$ -SDC composite materials as a cathode based on SDC electrolyte higher current density and power density can be obtained at intermediate temperatures.

Key words [IT-SOFC](#) [Composite cathode](#) [La_{1-x}Sr_xCuO_{3-δ}](#) [SDC](#)

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扩展功能

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