

复合阳极共烧制备致密 $\text{La}_{0.7}\text{Ca}_{0.3}\text{Cr}_{0.97}\text{O}_{3-\delta}$ 连接体薄膜的研究  
Fabrication of Dense  $\text{La}_{0.7}\text{Ca}_{0.3}\text{Cr}_{0.97}\text{O}_{3-\delta}$  Interconnect Thin Membrane on Composite Anode Support by Co-firing

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中文关键词: [陶瓷连接材料](#) [薄膜](#) [共烧](#) [SOFC](#)

英文关键词: [ceramic interconnect](#) [thin membrane](#) [co-firing](#) [SOFC](#)

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中文摘要:

固体氧化物燃料电池(SOFC)陶瓷连接材料的低成本薄膜化制备是现在公认的技术难题。为了改善传统NiO/YSZ阳极与 $\text{LaCrO}_3$ 基连接材料的共烧匹配性能,将化学性质稳定的 $\text{Y}_{0.7}\text{Ca}_{0.3}\text{Cr}_{0.9}\text{Zn}_{0.1}\text{O}_{3-\delta}$ (YCCZ)连接材料创造性地引入到NiO/YSZ阳极中,制备NiO/YSZ/YCCZ(6:4:2, m/m/m)三相复合阳极,并进行烧结特性、微观结构、电导率、热膨胀系数等系列性能的对比测试,结果表明NiO/YSZ/YCCZ新型复合阳极具有优良的综合性能。以NiO/YSZ/YCCZ为支撑体,采用浆料浸渍法制备湿膜,1400℃空气条件下共烧,成功制备致密 $\text{La}_{0.7}\text{Ca}_{0.3}\text{Cr}_{0.97}\text{O}_{3-\delta}$ 连接体薄膜。

英文摘要:

Developing cost-effective methods to prepare ceramic interconnect thin membrane for solid oxide fuel cell (SOFC) stacks is currently considered as a major technical obstacle. In order to improve co-firing compatibility of the traditional anode support NiO/YSZ with  $\text{LaCrO}_3$ -based interconnects, chemically stable interconnect material of  $\text{Y}_{0.7}\text{Ca}_{0.3}\text{Cr}_{0.9}\text{Zn}_{0.1}\text{O}_{3-\delta}$  (YCCZ) was introduced to NiO/YSZ anode. Triple-phase composite NiO/YSZ/YCCZ with the weight ratio of 6:4:2 was prepared, and then examined as novel anode support. Sintering character, microstructure, electrical conductivity, and thermal expansion coefficient of the composite anode were respectively investigated in detail as a function of YCCZ addition. Results indicate the NiO/YSZ/YCCZ anode has excellent overall performance. Furthermore, by using a simple and cost-effective drop-coating/co-firing process, dense  $\text{La}_{0.7}\text{Ca}_{0.3}\text{Cr}_{0.97}\text{O}_{3-\delta}$  interconnect thin membrane was successfully prepared on the novel NiO/YSZ/YCCZ anode support. This work provides a simple technical solution for dense ceramic interconnect fabrication for YSZ-based SOFC stacks.

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