URN etd-0407109-183713-1067
Author Chuan-Wei Wu
Author's Email Address No Public.
Statistics This thesis had been viewed 34 times. Download 0 times.
Department
Year 2003
Semester 1
Degree Master
Type of Document Master's Thesis
Language zh-TW.Big5 Chinese
Title Nanocrystalline GDC electrolyte fabricated for SOFCs by hydrothermal-coprecipitation technique
Date of Defense 0000-00-00
Page Count 80

Keyword
fuel cell
GDC electrolyte
hydrothermal-coprecipitation technique
nanocrystalline powder

Abstract
In this research, the gadolinia-doped ceria (GDC) powders were prepared using a hydrothermal-coprecipitation technique, and taken ammonium cerium nitrate, gadolinium oxidize and urea as the raw materials. The hydrothermal-coprecipitation technique was combined hydrothermal method and coprecipitation method. We made well crystallinity GDC powders by hydrothermal method, and took these powders as the precursor. Next, we would be obtained the final GDC powders due to the reaction of introduced the precursor and the other raw materials by coprecipitation method. Furthermore, the final GDC powders sintered at different temperature were used to the electrolyte for SOFC.

Precursor was prepared at 100℃~180℃ in 5 hours respectively. The characteristics of precursors were investigated by X-ray diffraction, energy-dispersive spectroscopy, and crystallite size analysis. From the results, the crystallinity would be become larger and the composition became more random when the hydrothermal treatment temperature higher than 120℃.

The sinterbility of final powders made from different precursors could achieve higher than 96% relative densities during 1400℃ for 2 hours. The highest relative density (more than 99%) could be found in the final powder from 120℃ precursor, which were significantly higher than that powders formed without precursor about 4~6%.

The conductance of the GDC electrolytes were studied on the relationship of sintering temperature and operated temperature. If we used the electrolyte that formed with 120℃ precursor, when the sintering temperature raise from 1400℃ to 1500℃, and the conductance would change from 2.3×10-2Scm-1 to 9.7×10-2Scm-1 during the test temperature 800℃. Furthermore, the GDC electrolyte still can exhibits good conductance (about 4.1×10-2Scm-1) even lower the operated temperature from 800℃ to 700℃.
Advisory Committee Wen-Chang Wu - advisor

Files No Any Full Text File.
Date of Submission 2004-08-11