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Abstract
In this study, the high dispersion, low anodic potential loss and high TPB. NiO-SDC anodic materials which could been used for low or middle temperature SOFC had been synthesized. The raw materials of ammonium cerium nitrate and samarium oxide were dissoluted with deionized water as synthesize solution, then poured into the ultrasonic disunite reactor. The SDC (Ce0.9Sm0.1O1.95) powders were obtained with ultrasonic reaction time for 10hr and calcined at 600℃ for 1h. The SDC powders formed have a particle size of 0.1~1μm, and were used to prepare the NiO-SDC anode.

The Chitosan was dissolution with HNO3 of 2M, it not only covered on the SDC surface but also chelated Ni ion. Then, the pH of solution charged from 3 to 6 with the NH4OH of 1M, and the Ni/CS/SDC precursor powders have been formed.

In order to obtain NiO-SDC powder from Ni/CS/SDC precursor powder in this study using high temperature calcined method. The Ni/CS/SDC precursor powders were thermal treatment at 1000℃ to remove the chitosan, and formed the NiO-SDC phase. Furthermore, we would control the weight ratio of Ni ion and Chitosan which could obtain most high Ni amount for 50wt% and composing distributed uniform over at the Ni/CS/SDC ratio for 10:10:1 .

Another, the pellet body would be cracked after sinter, because of it’s contain large amount the Chitosan in the Ni/CS/SDC precursor powder. So, first we calcined the Ni/CS/SDC precursor powders at 500℃ and were pressed uniaxially of 5000 psi. The, the NiO-SDC anode for anode support SOFC was obtain after sinter of sinter of 1000℃ for 1 hr.

On the other hand, this study have been used hydrothermal method and glyine-nitrate process method of synthesize SDC electrolyte powder and SSC-SDC cathode material powder, respectively. Then, SDC electrolyte powders have been milled mixed with ethyl cellulose and terpineol form electrolyte slurry. Then, SSC with SDC cathode powders have been milled mixed with polyethylene glycol 300 (PEG-300) form cathode slurry. Such as, electrolyte with cathode of slurry that had been casted on the anode support form single cell module by slurry casting mothed.

The single cell of three-layer was observed with SEM which two kinds of gas room cross-section were porous structure but electrolyte layer has much small pore and crack after co-sinter for 1400℃ for 4h. The cell produce OCV was 0.1~0.2V at the operating temperature 800℃, form the result indicated that the electrolyte film was non-dense and electrochemical test was not well.
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