عنوان مقاله:

Preparation of aliened porous Ni-GDC nano composite by freeze-casting process

محل انتشار:

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خلاصه مقاله:

This current study reports preparation of Nickel-Gadolinium doped Ceria (Ni-GDC) composite via controlled unidirectional freeze casting of aqueous-based GDC slurry completed with nickel infiltrated into the porous GDC samples. Gadolinium doped ceria powder prepared by gel-combustion synthesis method. The oxide powder was confirmed to be the fluorite-structured of Ce۰.۸Gd۰.۲O۱.۹ solid solution by X-ray diffraction. The synthesized powder with dolapix as a dispersant, ammoniac as an agent pH, poly vinyl alcohol (PVA) as a binder and water as a solvent were used to prepare stable GDC slurries. Freeze casting process was done in different solid loading of GDC at ۳۵, ۴۵ and ۴۴ wt. %, and two different rates of ۱ and ۳ Ĉ/min to obtain desirable pore structure. After removing the frozen ice at -۵۸ Ĉ the green samples were sintered for ۲ h in air at ۱۳۰۰ °C. The pore structure and final microstructure were studied by scanning electron microscopy. The porosity of the sintered samples was in a range of ۶۰-۷۰% , and were depended on solid content and freeze casting rate. Finally nickel solution was infiltrated into hierarchically porous .GDC samples, after reduction at ۸۰۰ Ĉ, Ni-GDC composite was attained

کلمات کلیدی:

Ni, GDC composite, gel, Combustion, Freeze casting, Pore structure