

Effect of calcination temperature on the conductivity of Sm and Cu co-doped ceria

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The impact of different calcination temperature (550°C, 650°C, 750°C and 850°C) on the structural/electrical properties of sintered Cu/Sm co-doped CeO₂ prepared by sol-gel combustion were studied. The structural property was studied by X-ray diffraction (XRD) and Raman spectroscopy and ultraviolet visible(Uv-vis). The composition and chemical state of Sm/Cu and Ce and electrical conductivity of sintered sample were investigated by X-rays photoelectron spectroscopy (XPS) and electrical impedance spectroscopy (EIS), respectively. XRD pattern showed that all samples have a cubic fluorite structure. Moreover, XRD revealed that the crystallite size and crystallinity increased with the increasing calcination temperature. However, the lattice parameter and oxygen vacancy slightly decreased with the increasing temperature, which indicates the change of oxidation state between Ce⁴⁺ and Ce³⁺. The high conductivity were obtained for samples calcined at 750°C.

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