

## Effects of YDZ:SDC ratio on ionic conductivity of a solid electrolyte

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It was studied the effects of YDZ:SDC proportion ratio on the ionic conductivity. These composites could be potential solid electrolytes for IT-SOFC. Synthesis of YSZ and SDC nanopowders was performed by solution-combustion method using nitrates as precursors and glycine and citric acid as the respective fuels. Powders were mixed by mechanical milling in proportions of 25:75, 50:50, 75:25 YDZ:SDC in weight %. Each mixture was then compacted at 11 tons (800.2 MPa) in pellets, which were sintered at 1350°C for 5 hours. Volumetric density and contraction of samples were determined to verify sintering progress. Pellets were characterized by X-ray diffraction and field emission scanning electron microscopy. The ionic conductivity of selected samples was determined by electrochemical impedance spectroscopy. For comparison, pellets of pure SDC and YSZ sintered at 1350°C were also analyzed.

Results indicated that as a consequence of interdiffusion, solid solutions are formed. They depend on the original ratio of YSZ and SDC used, judging by the X-ray diffraction spectra obtained in each case. In general, the increase of YSZ proportion on the mixture produced a rise on contraction whereas densification decreased slightly. Additionally, ionic conductivity is notably reduced.

**Keywords:** YDZ:SDC ratio, ionic conductivity, solid solution.

