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Synthesis and Characterizations of $Ce_{0.5}Sr_{0.5}Co_{0.8}Fe_{0.2}O_{3-\delta}$ (CSCF) Solid Oxide Fuel Cell Cathode Material by Sol-Gel method

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Abstract : $Ce_{0.5}Sr_{0.5}Co_{0.8}Fe_{0.2}O_{3-\delta}$ (CSCF) powders had been synthesized by Sol-Gel method. To get appropriate results, sintering temperature, heating and cooling rates and particle sizes were controlled. The prepared samples were calcined at 750°C for 3hrs and 900 °C for 5hrs. The sintered samples were characterized using XRD, SEM with EDS, Raman spectroscopy and TGA-DTA. XRD results showed the perovskite phase with average crystallite size of 26.57nm, density of 90.07%, lattice parameter 5.42293Å and cell volume of 159.47813Å³. Raman spectroscopy proved the existence of lattice vibrations with broader peaks at shoulders of 505.11cm⁻¹, 427.76cm⁻¹, 1455.30cm⁻¹, 434.04cm⁻¹ and 925.21cm⁻¹. TGA-DTA results gave information there were weight losses three times at 124.18°C, 330°C and 600°C.

Keywords : X-ray diffractometer, Density, Sol-Gel, $Ce_{0.5}Sr_{0.5}Co_{0.8}Fe_{0.2}O_{3-\delta}$.

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