Lanthanum Cuprate-Niquelate: synthesis, characterization and nanoparticles production by exsolution for SOFC anodes

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Climate emergency has become the century''s biggest concern due to the 1.5 ºC increase in the average temperature of the atmosphere, leading in the near future to a greater impact on natural events [1]. In recent years, several efforts have been made to achieve net-zero emissions, based in the substitution of fossil fuels matrix by decarbonization. Solid Oxide Fuel Cell (SOFC) stands out as a viable alternative due to it´s high efficiency, fuel flexibility and low-to-zero CO_2emissions. SOFC anodes are able to catalyze the fuel reduction. Among the used materials, perovskites are good candidates due to its high mixed ionic electronic conductivity and chemical and thermal stability. The present work seeks to obtain exsolved metal alloys nanoparticles' attached on perovskites structure [2] with the aim to adress a more promising material, challenging and less contemplated in the literature. The nanoparticles catalysts solubilized into a perovskite host was exposed to a reducing H_2atmosphere. The $La_{0.8}Sr_{0.2}Ni_{1-x}Cu_xO_3$[3] (x = 0.4, 0.5, 0.6) and $La_{1.2}Sr_{0.7}Ni_{0.5}Cu_{0.5}O_6$ were obtained by the Pechini synthesis route and calcinated at 1050 °C and 950 °C for 5 hours, respectively. To obtain decorated NiCu nanoparticles, the powders were heat-treated under 3 vol % H_2/N_2atm at 900 ºC for 10 hours. The sample''s characterization was performed by Scanning Electron Microscope, X-ray diffraction. Rietveld refinement will be use to determine structural parameters, how: crystal simetry, cristalite size and phase content. With prelymirary results it is possible to conclude that the chosen synthesis route and the reduction treatment was successful in obtain NiCu particles.

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