Synthesis of Lanthanum Chromite Doped with Nickel by Mechanosynthesis for Production of Nanoparticles by Exsolution

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Nowadays, the challenge of producing clean and renewable energy in a way that is economically applicable is increasing. The need to research and understand new methods for production of this type of energy has become an extremely important factor. In this scenario, Solid Oxide Fuel Cells (SOFCs) emerge as a promising candidate. SOFCs convert chemical energy into electrical energy, without the need of combustion, releasing almost no toxic substances to the environment. This work aims to present the synthesis of ABO_3 perovskite ($LaCrO_3$ doped with nickel). $LaCrO_3$ possesses excellent properties, such as good stability in both reducing and oxidizing atmospheres, good electronic or mixed conductivity and good catalytic activity [1]. Therefore, these characteristics make $LaCrO_3$ an interesting material for application in Solid Oxide Fuel Cells interconnectors mostly, but it can also be applied to their anodes. Moreover $LaCrO_3$ could be used as a matrix for nanoparticles exsolution. At first, lanthanum chromite powders were synthesized by chemical route (Pechini method), followed by a heat treatment. After that, $LaCrO_3$ was doped with NiO by mechanosynthesis, using planetary ball mills. In future developments, nickel oxide reduction treatments will be performed to obtain Ni nanoparticles through exsolution in the $LaCrO_3$ matrix. Detailed characterization of the powder will be carried out by means of X-Ray Diffraction crystalline structure analysis. Nickel is expected to be solubilized in the $LaCrO_3$ structure prior to its exsolution.

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