

Experimental Investigations on La_2NiO_4 Cathode for Solid Oxide Fuel Cell

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ABSTRACT

Lanthanum nickelate La_2NiO_4 (LNO) has been studied by room temperature the X-ray diffractometer (XRD) result show the formation of single phase tetragonal structure with lattice parameter. The average crystallite/grain sizes for the La_2NiO_4 bulk sample were calculated by using Debye-Scherrer formula and found to be of 181.59 nm. The surface morphology/topography of as synthesized material has been investigated by atomic force microscope (AFM) as well as scanning electron microscope (SEM). The AFM & SEM micrographs reveal that the particles/grains on the surface of the sintered pellet are closely packed and very few pores are observed among the grains boundaries. Energy dispersive spectroscopy (EDS) has been carried out to study the chemical composition and presence of other possible impurity phase in La_2NiO_4 bulk sample. Thermogravimetric analysis (TGA) was performed using thermal decomposition processes of the bulk material was studied in air environment by thermal analyzer, LNO was heated from 30°C to 900°C at a heating rate 10°C min⁻¹.

Keywords: Cathode material; La_2NiO_4 ; perovskite oxide; solid oxide fuel cell; solid state reaction.