Experimental report

26/06/2019

Proposal: 5-23-701 **Council:** 4/2017

Title: Temperature and synthetic conditions dependence of the oxygen vacancyformation on LaNi0.6Fe0.4O3-d perovskite

Research area: Materials

This proposal is a resubmission of 5-23-682

Main proposer: **Maria Isabel ARRIORTUA**

Experimental team: Juan Felipe BASBUS
Analia CABRERA
Gabriel Julio CUELLO

Local contacts: Gabriel Julio CUELLO

Samples: LaNi0.60Fe0.40O3

Instrument	Requested days	Allocated days	From	To
D2B	3	1	04/06/2018	05/06/2018

Abstract:

The development of new materials, as well as advanced solid oxide fuel cell (SOFC) components fabrication techniques, is critical in reducing operation temperature and subsequently lessening the cost of these systems. Particularly, combustion methods have been proposed as one of the most promising methods to prepare perovskite oxide powders to be used in SOFC technology. The characteristics of the combustion synthesis oxide powders are typically determined by several synthetic parameters, such as the species of fuel and oxidizer reactants, the fuel/oxidizer ratio, and the subsequent sintering treatment after combustion process.
The cathode contact material composition is required to possess high electrical conductivity and appropriate sintering activity to minimize the resistance of the contact layer itself and to protect the steel substrate from excessive oxidation. Besides, it should demonstrate an appropriate thermal expansion behaviour and high thermochemical and structural stability in the oxidizing cathode environment. For our study the LaNi0.6Fe0.4O3-d; perovskite has been selected for its use as contact layer.

Temperature and synthetic conditions dependence of the oxygen vacancy formation on $LaNi_{0.6}Fe_{0.4}O_{3-\delta}$ perovskite

The aim of this experiment was the determination of oxygen vacancies that give rise to significant changes in the electronic and ionic conductivity (limiting factor in the performance of these compounds at the operating temperatures of SOFCs). Nevertheless, due to the samples obtained under different preparation conditions, we have not been able to obtain appropriate results from the measurements, and we have decided to achieve the preparation of the samples under study in order to research suitable samples to be characterized using high resolution neutron diffraction technique.