

Investigation of rhombohedral - cubic phase transition of $\text{La}_{0.58}\text{Sr}_{0.4}\text{Co}_{0.2}\text{Fe}_{0.8}\text{O}_{3-\delta}$ using high temperature XRD

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Investigation of rhombohedral - cubic phase transition of $\text{La}_{0.58}\text{Sr}_{0.4}\text{Co}_{0.2}\text{Fe}_{0.8}\text{O}_{3-\delta}$ using high temperature

XRD

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Abstract

The phase transition of the $\text{La}_{0.58}\text{Sr}_{0.4}\text{Co}_{0.2}\text{Fe}_{0.8}\text{O}_{3-\delta}$ oxygen transport membrane material has been investigated by X-ray diffraction at elevated temperatures. It has a rhombohedral symmetry at room temperature that transforms to a cubic symmetry at operation relevant higher temperatures, which was investigated in detail in the current work on the basis of bar type and powder specimens and discussed in terms of correlations with mechanical behavior.

Keywords: Solid oxide fuel cell; Oxygen transport membrane; Perovskite; LSCF; XRD; phase transition;

1. Introduction

The perovskite $\text{La}_{0.58}\text{Sr}_{0.4}\text{Co}_{0.2}\text{Fe}_{0.8}\text{O}_{3-\delta}$ (LSCF) has been considered for the use as a cathode material in solid oxide fuel cells (SOFCs) and for oxygen transport membrane (OTM) application, since it verified a high oxygen permeation related to its mixed ionic-electronic conductivity at elevated temperatures and in addition, possesses an excellent stability at application temperatures and atmospheres [1-7].

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