Electrochemical stability of (La,Sr)CoO3-δ in (La,Sr)CoO3-δ/(Ce, Gd)O2-δ heterostructures

Introduction
A modulated coherent (La,Sr)CoO3-δ/(Ce,Gd)O2-δ heterostructure is characterized for the first time for its electronic and chemical properties. 2D-multilayer architectures are deposited on NdGaO3 (110) single crystal substrate by pulsed laser deposition, resulting in epitaxial structures with in-plane lattice rotation that, via the metal oxides’ interfaces, induces mutual structural rearrangements. Our results show that (La,Sr)CoO3-d thin films of 10-100 nm are chemically unstable when exposed to air at 600 °C during electrical cyclic stress-tests. Conversely, improved stability is achieved confining LSC in the nanometric heterostructure. Remarkably, the chemical stabilization occurs without compromising substantially the electrical properties of the LSC component: the heterostructures show unexpected electrical behavior with dominant electronic contributions, fast conductivity and mixed ionic-electronic properties, depending on the number of interfaces and the nano-scaled layers.

General information
Publication status: Published
Organisations: Functional Oxides, Department of Energy Conversion and Storage, Imaging and Structural Analysis, University of Málaga
Corresponding author: Esposito, V.
Pages: 2916-2924
Publication date: 2019
Peer-reviewed: Yes

Publication information
Journal: Nanoscale
Volume: 11
Issue number: 6
ISSN (Print): 2040-3364
Ratings:
BFI (2019): BFI-level 2
Web of Science (2019): Indexed yes
Original language: English
DOI:
10.1039/C8NR08528E
Source: PublicationPreSubmission
Source ID: 165711853
Research output: Contribution to journal › Journal article – Annual report year: 2019 › Research › peer-review