In situ TEM analysis of a symmetric solid oxide cell in oxygen and vacuum–cation diffusion observations - DTU Orbit (16/05/2019)

In situ TEM analysis of a symmetric solid oxide cell in oxygen and vacuum–cation diffusion observations

In order to establish the use of solid oxide fuel/electrolysis cells (SOFC/SOEC) in the energy market, a deeper understanding of degradation effects during operation is necessary. This study apply in situ transmission electron microscopy (TEM) of a symmetric model cell composed by two oxygen electrodes of La0.6Sr0.4CoO3-δ (LSC) and an electrolyte, ZrO2: 8% mol Y2O3 (8YSZ), deposited on 1% Nb doped SrTiO3-δ (STN) single crystal substrate by pulsed laser deposition. The results showed a high cation mobility of the electrodes when exposed to 900 ºC. Cobalt is found to agglomerate at the interface between LSC and STN. Strontium depletion is observed in both electrodes. Finally, a faster grain growth occurs in LSC for the cell exposed to oxygen in comparison with the cell in vacuum.

General information
Publication status: Published
Organisations: Department of Energy Conversion and Storage, Imaging and Structural Analysis, Center for Electron Nanoscopy, Electrofunctional materials, Nagoya University
Contributors: Gualandris, F., Simonsen, S. B., Wagner, J. B., Sanna, S., Muto, S., Kuhn, L. T.
Pages: 123-133
Publication date: 2017
Peer-reviewed: Yes

Publication information
Journal: ECS Transactions
Volume: 75
Issue number: 42
ISSN (Print): 1938-6737
Ratings:
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 0.44 SJR 0.225 SNIP 0.252
Web of Science (2017): Indexed yes
Original language: English
Electronic versions:
in_situ.pdf. Embargo ended: 31/07/2017
DOIs:
10.1149/07542.0123ecst
Source: PublicationPreSubmission
Source-ID: 128771486
Research output: Contribution to journal › Journal article – Annual report year: 2017 › Research › peer-review