Infiltration of SOFC Stacks: Evaluation of the Electrochemical Performance Enhancement and the Underlying Changes in the Microstructure

Infiltration of SOFC Stacks: Evaluation of the Electrochemical Performance Enhancement and the Underlying Changes in the Microstructure

Experimental SOFC stacks with 10 SOFCs (LSM-YSZ/YSZ/Ni-YSZ) were infiltrated with CGO and Ni-CGO on the air and fuel side, respectively in an attempt to counter degradation and improve the output. The electrochemical performance of each cell was characterized (i) before infiltration, (ii) after infiltration on the cathode side, and (iii) after the infiltration of the anode side. A significant performance enhancement was observed after the infiltration with CGO on the cathode, while the infiltration of the anode side with Ni-CGO had no significant effect on the electrochemical performance. After testing the cells were characterized by SEM and TEM/EELS. A thin layer of CGO nanoparticles around the LSM-YSZ back bone structure was found after infiltration. On the anode side nano sized Ni particles were found embedded in a CGO layer formed around the Ni-YSZ structure. EELS analysis showed that the oxidation state of the Ce ions is identical on the air and the fuel side.

General information
Publication status: Published
Organisations: Department of Energy Conversion and Storage, Mixed Conductors, Applied Electrochemistry, Imaging and Structural Analysis, Case Western Reserve University, Haldor Topsoe AS
Number of pages: 9
Pages: 80-88
Publication date: 2016
Peer-reviewed: Yes

Publication information
Journal: Fuel Cells
Volume: 16
Issue number: 1
ISSN (Print): 1615-6846
Ratings:
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.79 SJR 0.495 SNIP 0.603
Web of Science (2016): Impact factor 1.706
Web of Science (2016): Indexed yes
Keywords: Impregnation, Infiltration, SOFC Stack, Solid Oxide Fuel Cell, TEM-EELS
DOIs:
10.1002/fuce.201500107
Source: FindIt
Source ID: 2290040494
Research output: Contribution to journal › Journal article – Annual report year: 2016 › Research › peer-review