Correlating Oxygen Electrode Degradation to Cr Vaporization from Metallic Interconnects in Solid Oxide Cell Stacks

Talic, Belma; Hendriksen, Peter Vang

Publication date: 2018

Document Version
Publisher's PDF, also known as Version of record

Link back to DTU Orbit

Citation (APA):

General rights
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.
CONTROL ID: 2813622


CURRENT SESSION: Ceramic and metallic interconnects; degradation mechanisms, coatings, accelerated testing and life prediction

PRESENTATION TYPE: Contributed (Oral)

TITLE: Correlating Oxygen Electrode Degradation to Cr Vaporization from Metallic Interconnects in Solid Oxide Cell Stacks

AUTHORS (LAST NAME, FIRST NAME): Talic, Belma¹; Hendriksen, Peter Vang¹


ABSTRACT BODY:

Abstract Body: Volatile Cr species released from stainless steel interconnects in solid oxide cell stacks lead to rapid degradation of the oxygen electrode. Many studies have been devoted to elucidate the oxygen electrode degradation mechanism and methods are available to accurately measure the Cr vaporization rate of stainless steel interconnect materials. Coating the interconnect with MnCo₂O₄ has been shown to greatly reduce the Cr vaporization rate, but it is difficult to determine whether this coating material is protective enough as there are no reports of a clear correlation between the interconnect Cr vaporization rate and the oxygen electrode degradation rate. The aim of this work is to investigate if such a correlation can be found. Symmetrical cell consisting of La₀.₅₈Sr₀.₄Co₀.₂Fe₀.₈O₃₋δ (LSCF) oxygen electrodes screen printed on Ce₀.₉Gd₀.₁O₂₋δ (CGO) electrolyte were tested at 800 °C while exposed to Crofer 22 APU alloy that was either pre-oxidized or coated with MnCo₂O₄. The MnCo₂O₄ coating was heat treated to produce different levels of porosity, resulting in different Cr vaporization rates. Degradation of the symmetrical cells was monitored by electrochemical impedance spectroscopy measurements and post-mortem SEM and EDS analysis was used to examine Cr deposition on the oxygen electrodes.

KEYWORDS: SOFC, Interconnect, Cr poisoning, Protective coating, Oxygen electrode, Cr evaporation.

Presenter Acknowledgment: I have read and acknowledge the above paragraph

PROFESSIONAL/ACADEMIC STATUS:

Belma Talic : Faculty
Peter Vang Hendriksen : Faculty