conferenceseries.com

2nd International Conference on

Battery and Fuel Cell Technology

July 27-28, 2017 | Rome, Italy

Investigations on the long operation-time microstructural degradation phenomena of solid oxide fuel cells electrodes: chromium poisoning in cathodes and nickel percolation in anodes

M Amine Essafi University of Oldenburg, Germany

In this work, certain microstructural degradation phenomena of Solid Oxide Fuel Cell (SOFC) electrodes consisting of LSM/YSZ (Lanthanum Strontium Manganite/Yttria-Stabilized Zirconia) cathodes and Ni/CGO (Nickel/Gadolinium-doped ceria) anodes were investigated. The aim is to identify those long-term degradation phenomena within an SOFC cell by specific methodology for samples that were aged with different operating times (1000 h, 2500 h, 15000 h and 20000 h). For the LSM/YSZ cathodes, it is necessary to check and evaluate if there is a chromium poisoning. For this purpose, wavelength-dispersive X-ray spectroscopy was the method used to determine the elemental composition of the cathodes. For the anodes, the respective changes in the morphology of Ni/CGO anodes (e.g., nickel percolation or agglomeration) can be recognized and demonstrated with a time-saving method. Firstly, the necessary preparation methods for the electron microscopy of SOFC cells were improved in order to enable the investigation of the anodes. The different samples were then examined by means of a high-resolution field-emission low-voltage scanning electron microscopy using two different detectors. After image acquiring and some image processing techniques, the results were provided. Indeed, both selected methods, enabled the investigation of both cathodes and anodes degradation phenomena.

essafi@web.de