

Infiltration of SOFC Stacks: Evaluation of the Electrochemical Performance Enhancement and the Underlying Changes in the Microstructure - DTU Orbit (08/11/2017)

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 backbone 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.

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