Comparison between La_{0.6}Sr_{0.4}CoO_{3-d} and LaNi_{0.6}Co_{0.4}O_{3-d} infiltrated oxygen electrodes for long-term durable solid oxide fuel cells - DTU Orbit (21/12/2018)

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The degradation of infiltrated oxygen electrodes during long-term operation of solid oxide fuel cells (SOFCs) was studied. The infiltrated oxygen electrodes were prepared by infiltration of the electro-catalysts La_{0.6}Sr_{0.4}CoO_{3-d} (LSC) and LaNi_{0.6}Co_{0.4}O_{3-d} (LCN) into a porous yttria stabilized zirconia (YSZ) backbone that was pre-infiltrated with a gadolinium doped ceria (CGO) barrier layer. The performance of the infiltrated LSC and LCN electro-catalysts were compared for both symmetrical cells and full SOFCs. Galvanostatic long-term performance tests up to 1400h at 700°C and 0.5 A/cm² were conducted and the change of resistance was followed by electrochemical impedance spectroscopy under current load. The cell performance degradation profiles of the LSC and LCN infiltrated cells showed significant differences. The performance of the LSC infiltrated cell stabilized after 700h of operation and the LCN infiltrated cell degraded throughout the entire testing period. The difference between the intrinsic properties, i.e. its electrochemical activity, ionic conductivity, and reactivity of LSC and LCN materials was hypothesized to be responsible for the observed difference in the degradation profile.

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