Microstructure degradation of LSM-YSZ cathode in SOFCs operated at various conditions - DTU Orbit (02/01/2019)

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Systematic microstructural analyses have been carried out on a series of technological SOFCs that went through long-term cell tests with various operating parameters including temperature, current load and time length under current. For the LSM-YSZ cathode, a number of microstructure degradation mechanisms have been identified. And it has been observed that different mechanisms dominate the degradation process under different test conditions. The severe cathode degradation at 750 °C operation with high current density is attributed to a loss of the cathode/electrolyte interface stability. For the cells tested at 850 °C, the interface stability is maintained due to further sintering during cell operation. A cell test lasting for 2 years (17500 h) at 850 °C with a moderate current density (not greater than 1 A/cm²) has shown that the cathode microstructure is fairly robust to the degradation processes at this temperature, such as grain coarsening and element diffusion. The cell degrades mildly with a cell voltage degradation rate of 7 mV/1000 h.

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