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EHF - EST

Microstructure Degradation in Solid Oxide Fuel Cell

Solid oxide fuel cells (SOFCs) are electrochemical conversion devices that can be used to generate electrical power in a proper manner and with high efficiency. Thanks to the high operating temperature (up to 1 000 °C), SOFCs are able to operate by using different hydrocarbons as fuel (CH₄, CO, CO₂ etc.) without using an external reformer. However, due to the severe operating conditions, the SOFC conversion efficiency steadily decreases by a few percent per 1 000 h. One of the main causes for this power loss is the microstructural changes in the anode after a long operating time under harsh conditions. Therefore, understanding SOFC degradation mechanisms in the microstructure is important to enhance the lifetime and reliability of the SOFC system. In this talk, the impact of a relatively long exposure time (up to 20 000 h) under realistic operation terms in the kinetics of microstructural degradation for porous nickel (Ni)/Cerium Gadolinium Oxide (CGO) anodes are investigated using a combined system of Focused Ion Beam (FIB) and Scanning Electron Microscope (SEM).