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Interface resistance between FeCr Interconnects and $La_{0.85}Sr_{0.15}MnO_3$

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The long term oxidation behaviour and the electrical interface resistance between FeCr alloy sheets and $La_{0.85}Sr_{0.15}MnO_3$ plates was studied by a DC four-point method in air at 750°C for 10000 h. The test was terminated with thermal cycles. The tested FeCr alloys were: Crofer 22 APU, Sanergy HT and Plansee alloys. The alloys were slurry sprayed with a dual layer coating consisting of an inner cobalt containing oxide and an outer perovskite containing oxide layer. The microstructure and composition of the oxide scales formed at the interfaces was investigated using SEM/EDX analysis.

Low degradation rates of less than 1 $m\Omega cm^2$/1000 h were measured on several of the interfaces. The microstructure analysis showed that a duplex Cr_2O_3-spinel oxide scale with a thickness of 4-5 µm was grown on the alloys. The relative thickness of the Cr_2O_3 and spinel layers varied between the alloys showing that minor compositional changes of the alloys affect the oxide formation. Furthermore, the composition of the spinel was affected by the composition of the alloy as well as the composition of the dual layer coating.

The low degradation rates measured during the 10000 h long term test is promising for the lifetime durability of slurry coated interconnects in SOFC stacks.