Diffusion couple study of the interaction between Cr2O3 and MnCo2O4 doped with Fe and Cu - DTU Orbit (18/08/2019)

**Diffusion couple study of the interaction between Cr2O3 and MnCo2O4 doped with Fe and Cu**

Manganese cobalt spinel oxides are promising coating materials for the protection of ferritic stainless steel interconnects in solid oxide fuel cell (SOFC) stacks. The interaction between such coatings and the steel is here studied using diffusion couples as a model system. The interaction between MnCo2O4, MnCo1.7Fe0.3O4 and MnCo1.7Cu0.3O4 spinels and Cr2O3 was studied in air at 900 °C. In all cases, a reaction layer rich in Co and Cr formed at the interfaces. Using Pt-particles to mark the original interface reveals that the reaction layers grow by diffusion of Co (and Mn) from the spinel oxides to the Cr2O3/reaction layer interface. The growth of the reaction layers followed parabolic kinetics with rate constants of 1.3×10−5 μm2 s−1 for the MnCo2O4/Cr2O3 couple, 8.6×10−6 μm2 s−1 for the MnCo1.7Fe0.3O4/Cr2O3 couple, and finally 1.2×10−4 μm2 s−1 for the MnCo1.7Cu0.3O4/Cr2O3 couple.

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