Evaluation of electrodeposited Mn-Co protective coatings on Crofer 22 APU steel

Interconnects used in Solid Oxide Cells stacks require protective coatings to lower their parabolic rate constant and block chromium evaporation (on the air side). In this work four different protective coatings on steel are evaluated for their high temperature corrosion resistance and electrical conductivity. A commercial electroplating process was used for the preparation of coatings with different Mn/Co ratios on Crofer 22 APU steel. Oxidation of samples was performed in air at 800°C for 1000 hours. Postmortem analysis of the coated samples was performed by scanning electron microscopy and x-ray diffractometry. Based on the results, influence of the Co/Mn ratio on the resulting corrosion properties are discussed. Parabolic rate constant of the coated samples is the lowest for the MnCo sample, whereas electrical resistance is the lowest for the Co sample, which has a corrosion rate similar to the not-coated alloys.