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Electrophoretic deposition and sintering of a nanostructured manganese-cobalt spinel coating for solid oxide fuel cell interconnects

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Abstract

Solid oxide fuel cell (SOFC) is one of the promising candidates for clean energy production. Due to the high operating temperature of SOFCs, a protective coating is commonly applied on the surface of interconnects to prevent oxidation. In this study, electrophoretic deposition was employed to prepare a manganese-cobalt spinel coating on ferritic stainless steel (AISISAE430) substrates. Nanostructured MnCo_2O_4 powder with an average crystallite size of 60 nm was utilized and the sintering behavior of the coatings at different temperatures was studied. Non-isothermal and isothermal sintering behavior of the powder were examined by employing a sensitive dilatometer. Master sintering curve of the spinel powder was also established. The activation energy of sintering was determined to be $513 \pm 13 \text{ kJmol}^{-1}$. Finally, the oxidation

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