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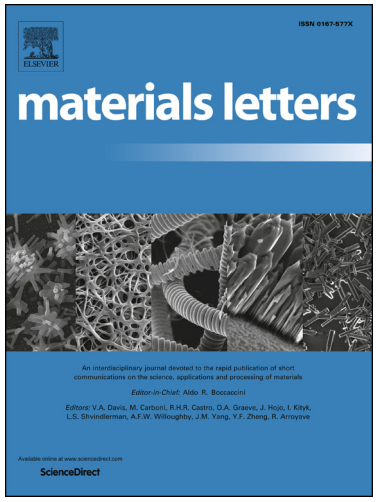

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Co-deposition of CuO and $Mn_{1.5}Co_{1.5}O_4$ powders on Crofer22APU by electrophoretic method: structural, compositional modifications and corrosion properties

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Abstract

Co-deposition of CuO and $Mn_{1.5}Co_{1.5}O_4$ by single step electrophoretic deposition is used to produce ~15 µm coatings on Crofer22APU steel, which finds use as interconnect for high temperature solid oxide cells. Sintering of the green coatings in reducing and then oxidizing conditions led to formation of a mixed $(Cu,Mn,Co)_3O_4$ spinel. By the incorporation of Cu, the density of the coatings improved. Scanning and transmission electron microscopy observations, supplemented with energy dispersive spectroscopy, confirmed dissolution of Cu in the spinel phase. For the un-doped $Mn_{1.5}Co_{1.5}O_4$ both the tetragonal and cubic phases are detected at room temperature by x-ray diffractometry, whereas the addition of Cu seems to stabilize the cubic phase. Initial (~1000 hours) high temperature corrosion evaluation at 800°C in air showed promising properties of the mixed spinel coating.

Keywords: ceramics; corrosion; deposition; sintering;