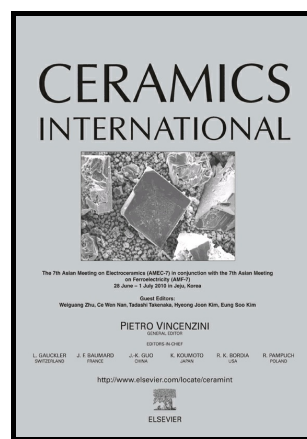


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Synthesis and characterisation of $\text{MnGa}_x\text{Cr}_{2-x}\text{O}_4$ ($0.1 \leq x \leq 1$) spinels as potential electrode support materials for intermediate-temperature solid oxide fuel cells

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Abstract

$\text{MnGa}_x\text{Cr}_{2-x}\text{O}_4$ (MGCO, $x=0.1, 0.2, 0.4, 0.8, 1$) oxides are synthesised using a citric acid nitrate combustion method. The influence of Ga substitution on the structure, electrical conductivity and electrochemical performance are systematically investigated. The chemical and thermal compatibility of MGCO materials with yttrium-stabilised zirconia (YSZ) are also studied. All the samples exhibit a single phase spinel structure. Thermal expansion coefficients (TECs) of the MGCO oxides are in the range of $9\text{-}12 \times 10^{-6} \text{ K}^{-1}$, indicating a good thermal match with the YSZ electrolyte. No chemical reactions are detected between MGCO materials and YSZ, indicating their good chemical compatibility with YSZ. The magnitude of electrical conductivity of all the obtained samples is in the order of about $10^{-3} \text{ S cm}^{-1}$ at $800 \text{ }^\circ\text{C}$ measured in air. The polarisation resistance reaches a value as low as $5.2 \text{ } \Omega \text{ cm}^2$ for

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