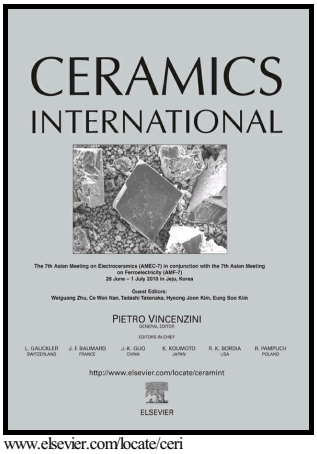

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Lowering the co-sintering temperature of cathode–electrolyte bilayers for micro-tubular solid oxide fuel cells

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Abstract

To prevent undesirable reactions between the cathode and electrolyte materials in cathode-supported solid oxide fuel cells (SOFCs), the co-sintering temperature of these two layers needs to be lowered. In the present work, we employed different strategies to lower the co-sintering temperature of cathode–electrolyte bilayers for micro-tubular SOFCs by increasing the cathode sintering shrinkage and adding sintering aids to the electrolyte. Strontium-doped lanthanum manganite (LSM) and yttria-stabilized zirconia (YSZ) were used as the cathode and electrolyte materials, respectively. To facilitate densification of the electrolyte layer by controlling the shrinkage of the cathode support, the particle size of the LSM powder was reduced by high-energy ball milling and different amounts of micro-crystalline cellulose pore former were used. Sintering aids, namely NiO and Fe_2O_3, were also added to the YSZ electrolyte to further improve its low-temperature sintering. Our results indicate that with the