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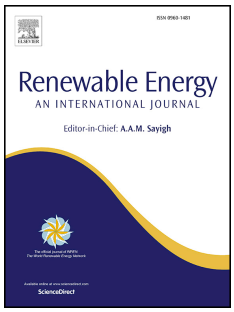

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Design of new Ga-doped $SrMoO_3$ Perovskites performing as anode materials in SOFC

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ABSTRACT

We have designed and prepared $SrMo_{1-x}Ga_xO_{3-\delta}$ (x = 0.1 and 0.2) perovskite oxides. Their performance as anode materials in intermediate-temperature solid-oxide fuel cells (IT-SOFC) has been investigated. The characterization of these oxides included X-ray (XRD) and neutron powder diffraction (NPD) for x= 0.1 and 0.2. At room temperature, $SrMo_{1-x}Ga_xO_{3-\delta}$ perovskites are defined in the *Pm-3m* space group. The crystal structure is defined as a simple-cubic perovskite unit cell, as observed from NPD data. The electrical conductivity gave maximum values of 268 and 58 Scm^{-1} at 850 ^oC for x= 0.1 and x= 0.2, respectively. In single test cells these materials generated output powers near 900 mW/cm^{-2} at 850 ^oC using pure H_2 as fuel, and demonstrated substantial performance with CH_4. Polarization curves and electrochemical impedance spectra (EIS) under open circuit were investigated. An adequate thermal expansion coefficient, an excellent reversibility upon cycling in oxidizing–reducing atmospheres and chemical compatibility with the electrolyte make these oxides perfect candidates for anodes in intermediate-temperature SOFC (IT-SOFCs).