

**Structural, micro-structural and electrical properties of
perovskite-type cathodes,
(La_{0.75}Sr_{0.25})(Mn_{0.85}M_{0.1}Ni_{0.05})O_{3+δ}, M=Fe and Co, for
intermediate-temperature solid oxide fuel cell application**

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Abstract : The intermediate-temperature solid oxide fuel cell (IT-SOFC) is a promising candidate for future powder generation systems. The present paper reports on structural, micro-structural and electrical properties of perovskite-type cathodes, (La_{0.75}Sr_{0.25})(Mn_{0.85}M_{0.1}Ni_{0.06})O_{3+δ}, where M=Fe and Co, for IT-SOFC application. The samples were synthesized using metal acetates by the Pechini method. Samples exhibited rhombohedral symmetry of R - 3c space group with a unit cell volume of 351.21 for M = Fe and 350.54 Å³ for M=Co relative to the rhombohedral LaMnO₃(~353.05Å³), and found corroborative to the FT-IR spectroscopy study. The crystallite size was slightly higher for M = Fe than one with M = Co, resulting in a particle size slightly higher, as observed by the SEM study. The BET surface area was 1.21 for M = Fe and 1.25 m²/g for M=Co. Electrical conductivity, ~49 for M = Fe and ~52 S/cm for M = Co, was obtained at ~600 °C along with an activation energy of ~0.13 eV. Ionic conductivity was sufficiently high, ~0.057 for M = Fe and ~0.069 S/cm for M = Co at ~600 °C, making it suitable for IT-SOFC application. The samples were also found chemically inert and compatible to the IT-SOFC solid electrolytes.

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