

# **(Gd,Ce)(NO<sub>3</sub>)<sub>x</sub>-Modified-LSM Cathodes for Intermediate Temperature Solid Oxide Fuel Cells**

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## **ABSTRACT**

Development of high performance cathodes with low polarization resistance is critical to the success of solid oxide fuel cell (SOFC) development and commercialization. In this paper, Gd<sub>0.2</sub>Ce<sub>0.8</sub>O<sub>1.9</sub>(GDC)-(La<sub>0.8</sub>Sr<sub>0.2</sub>)<sub>0.9</sub>MnO<sub>3</sub> (LSM) composite powder (GDC ~30 wt %) was prepared through modification of LSM powder by Gd<sub>0.2</sub>Ce<sub>0.8</sub>(NO<sub>3</sub>)<sub>x</sub> solution impregnation. The electrode polarization resistance of the cathode made of Gd<sub>0.2</sub>Ce<sub>0.8</sub>(NO<sub>3</sub>)<sub>x</sub>-modified-LSM powder was ~0.60 Ω cm<sup>2</sup> at 750°C, which is ~13 times lower than that of pure LSM cathode (~8.19 Ω cm<sup>2</sup> at 750°C) on YSZ electrolyte substrates. Gd<sub>0.2</sub>Ce<sub>0.8</sub>(NO<sub>3</sub>)<sub>x</sub> solution impregnation modification not only inhibits the growth of LSM grains during sintering but also increases the triple-phase-boundary (TPB) area through introducing ionic conducting phase (Gd,Ce)O<sub>2-δ</sub>, leading to the significant reduction of electrode polarization resistance of LSM cathode.

**Keywords:** Intermediate-temperature solid oxide fuel cell; Composite cathode; Ion impregnation; Polarization resistance.