

Effects of LCN ($\text{LaCo}_{1-x}\text{Ni}_x\text{O}_{3-\delta}$) modified on Ni/YSZ anode in solid oxide fuel cells operating on CH_4 fuels

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$\text{LaCo}_{1-x}\text{Ni}_x\text{O}_{3-\delta}$ (LCN) was investigated as an alternative anode material for solid oxide fuel cells. LCN synthesized by the Pechini method exhibits unstable phase with YSZ electrolyte at high temperature, forming electrochemically inactive phase such as $\text{La}_2\text{Zr}_2\text{O}_7$. In order to minimize forming $\text{La}_2\text{Zr}_2\text{O}_7$ phase, the LCN was coated by tape casting method on the Ni/YSZ anode as a catalytic functional layer and Ni/YSZ was coated on the YSZ electrolyte as an electrode layer. The LCN-modified Ni/YSZ anode exhibit excellent cell performance than the Ni/YSZ anode in CH_4 fuel condition. Due to the low catalytic activity of carbon formation, the cell performance of the LCN-modified Ni/YSZ anode was improved by 2 times than that of the Ni/YSZ anode in CH_4 . The detection of carbon was reduced in the LCN-modified Ni/YSZ anode due to the catalytic oxidation of the deposited carbon on the LCN layer as well as electrochemical oxidation of methane.