

### Characteristics of $\text{LaCo}_{1-x}\text{Ni}_x\text{O}_{3-\delta}$ coated on N/YSZ anode for utilization in methane fuel condition in solid oxide fuel cells

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$\text{LaCo}_{1-x}\text{Ni}_x\text{O}_{3-\delta}$  (LCN) with perovskite structure was investigated as an alternative anode for use in  $\text{CH}_4$  fuels in solid oxide fuel cells. LCN, however, reacts with the YSZ electrolyte at high temperatures to form electrochemical inactive materials such as  $\text{La}_2\text{Zr}_2\text{O}_7$ . To minimize the interlayer by-products, the LCN was coated by double-tape casting method on the N/YSZ anode as a catalytic functional layer. Due to the LCN coating on the N/YSZ anode, the cell performance improved from 92.48  $\text{mW/cm}^2$  to 184.27  $\text{mW/cm}^2$  in  $\text{H}_2$  and from 60.84  $\text{mW/cm}^2$  to 115.56  $\text{mW/cm}^2$  in  $\text{CH}_4$  at 800°C. Due to the low catalytic activity of carbon formation, carbon deposition was significantly reduced when  $\text{CH}_4$  fuel was used in the LCN coated N/YSZ anode. In contrast to the N/YSZ anode, the LCN coated cell showed stable performance over 200 hours under  $\text{CH}_4$  fuel condition.