Effect of SDC Modification on Cathode for Low Temperature Solid Oxide Fuel Cell

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To increase solid oxide fuel cell performance operating at intermediate temperature below 700oC, cathode modifications were performed in electrode microstructure control with an electronic conductor, La0.8Sr0.2MnO3 (LSM), and a mixed conductor, La0.6Sr0.4Co0.2Fe0.8O3 (LSCF). For both cathode materials, Sm0.2Ce0.8O2 (SDC) buffer layer as a diffusion barrier layer was coated on the yttria-stabilized zirconia(YSZ) electrolyte to prevent the interlayer formation of SrZrO3 and La2Zr2O7 which have a poor ionic conductivity. The interfacial reaction products were hardly formed in electrolyte/cathode interlayer by applying SDC layer sintering at high temperature and the cathode polarization was also decreased. Moreover, to enlarge the triple phase boundary, SDC was coated in sol-gel method after sintering the cathode to improve cell performance at low temperature. Cathode resistance for LSCF cathode cell with SDC modification was as low as 0.11Ωcm2 in air atmosphere, measured at 700oC. The maximum power densities by cell modifications were 369mW/cm2 for LSCF cathode cell, and 271mW/cm2 for LSM cathode cell.