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Abstract:

Attaining a fine microstructure with uniform distribution phases is of great significance in LSM/YSZ-like composite cathode for the enhancement of triple phase boundaries and in turn the performance of solid oxide fuel cell (SOFC). In the present study, solution precursor plasma spraying (SPPS) is employed to develop such a cathode by varying the plasma power in the process. Microstructural aspects and polarization values of the SPPS developed cathodes are compared with cathodes obtained from conventional mixing of LSM and YSZ phases and co-synthesized LSM/YSZ powders. Composition, microstructure and performance of the plasma sprayed coating are found to be strongly dependent on deposition power. Composition of the coating deposited at lower power is slightly richer in LSM content; however, the amount of LSM decreases with increase in the power. Polarization resistance of the coatings deposited at lower power is found to be much smaller than those fabricated from co-synthesized powders and by conventional method. Superior performance in SPPS coating has been attributed to the fine microstructure of the coating with nano phases.

Key words: Solid oxide fuel cell; Composite cathodes; Solution precursor plasma spraying; Polarization resistance; impedance spectroscopy

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