Fabrication of a Ceramic-based Honeycomb Type SOFC

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A design and development of a porous ceramic-honeycomb-supported SOFC is reported in this work. The porous support was prepared by mixing 3YSZ powder with pore former in ethanol media followed by drying. The dried powder mixture was die-pressed into honeycomb and sintered in air. Using dip coating and simple and cheap masking methods, the anode slurry was first coated onto selective channels and then onto exterior walls of the support, leaving the ceramic exposed onto the non-selective channels of the honeycomb. YSZ electrolyte slurry was subsequent coated onto the layers of anode inside the channels and outer walls, leaving the bottom side the exposed anode. LSM slurry was further coated onto the YSZ electrolyte film inside the selective channels and the top side of the honeycomb. The 3YSZ ceramic is exposed to fuel environment in the non-selective channels, meanwhile the LSM cathode is exposed to oxidant environment on the bottom side and in the selective channels.