

Low Temperature Composite Cathodes for SOFC Applications

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Improved cathode materials are critical to reducing the operating temperature of SOFCs. State of the art cathode materials require operating temperatures above 800°C to provide low interfacial resistance, and sintering temperatures >1000°C to achieve sufficient adherence to the electrolyte layer. Composite materials have been identified as a promising approach to improving electrode behavior through the increase of the three-phase-boundary (tpb) area. Electrocatalytic effects have also been proposed as a mechanism that may explain the reduction in interfacial resistance. To investigate the relationship between component composition, surface area, and processing routes, a series of low temperature anode and cathode materials have been developed using a nanocomposite approach. It has been demonstrated nanocomposite materials allow significantly lower processing temperatures and better performance than conventional composite materials, but require careful processing to take full advantage of the synergistic effects.