EFFECT OF ANODE POROSITY AND PORE SIZE ON ELECTROCHEMICAL PERFORMANCE

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Solid oxide fuel cells consisting of LSCF, YSZ and Ni-YSZ were fabricated with anodes of controlled porosity and pore size. The effects of porosity and pore size on cell performance were investigated theoretically and experimentally. A geometric simulation was used to determine the three-phase-boundary length (TPBL) which is one of main factors determining the anodic reaction and consequently the cell performance. The TPBL calculation indicated there exists an optimum porosity and pore size in the anode, depending on grain size. A porosity of 35-40% was found to be optimum for fuel cell performance in our cells. Based on the anodes tested with pore size from 1 to 10 μm, it was found that cell performance improved with increasing pore size.