High Performance Infiltrated Backbones for Cathode-Supported SOFC's

The concept of using highly ionic conducting backbones with subsequent infiltration of electronically conducting particles has widely been used to develop alternative anode-supported SOFC's. In this work, the idea was to develop infiltrated backbones as an alternative design based on cathode-supported SOFC. The cathodes are obtained by infiltrating LSM into a sintered either thick (300 μm) yttria stabilized zirconia (YSZ) backbone or a thin YSZ backbone (10-15 μm) integrated onto a thick (300 μm) porous strontium substituted lanthanum manganite (LSM) and YSZ composite. Fabrication challenges, microstructural characterization and electrochemical testing are discussed. Data on polarization resistance, Rp, are obtained from impedance spectra recorded on quasi-symmetrical cells (YSZ backbones/YSZ/LSM-YSZ (screen printed)). The backbones are infiltrated with LSM and compared to a standard LSM-YSZ screen printed symmetrical cells. Samples with LSM/YSZ composite and YSZ backbones made with graphite+PMMA as pore formers exhibited comparable Rp values to the screen printed LSM/YSZ cathode. This route was chosen as the best to fabricate the cathode supported cells. SEM micrograph of a cathode supported cell with infiltrated LSM nanoparticles is shown in Fig. 1. Figure 1. Cross section of LSM infiltrated cathode supported cell.