Losses in a solid oxide fuel cell (SOFC) arise not only from the resistance to O$_2^-$-ion conduction across the electrolyte, but also from the rate of reactant dissociative chemisorption and migration across the electrode/electrolyte interfaces. According to previous studies in our group, both oxygen reduction on the surface and the oxide-ion conductivity in the bulk could be the rate determination steps of oxygen conduction in the mixed oxide-ion/electronic conductors (MIEC). Pt has been used widely as catalyst in the electrodes of the proton exchange membrane (PEM) fuel cell. Previous researchers have also used a Pt/oxide composite as a SOFC cathode material. Sputtering of the catalyst on the electrode surface reduces the Pt loading. We have investigated the enhancement by Ag and Pt catalysts for the dissociative chemisorption of O$_2$ at the surface of a MIEC cathode and of Pt for H$_2$ and CH$_4$ chemisorption on Cu and Ni anodes; a Cu anode is preferred over a Ni anode for hydrocarbon fuels. In this study, a power density of 1400 mW/cm$^2$ could be reached at 800°C with a 200 µm thick La$_{0.8}$Sr$_{0.2}$Ga$_{0.83}$Mg$_{0.17}$O$_{2.815}$ electrolyte.

**REFERENCE**


**Figure 1.** Comparison of overpotentials at 800°C of a SCF cathode without and with Ag and Pt catalyst sputtered onto the surface.

**Figure 2.** A. SEM image of the SCF surface. B. SEM image of the SCF with Pt sputtered for 5 min onto the surface.

**Figure 3.** Cell voltage and power density as a function of current density at various temperatures. The cell consists of air, Pt+SCF/LSGM/LDC/LDC+Ni, dry H$_2$. The LSGM thickness is 200 µm.