Solid Oxide Fuel Cells (SOFC) have attracted great attention due to highly efficient electric power generation, system modularity, multi fuel capability and possibility of direct hydrocarbon conversion. Traditional YSZ electrolytes need high operating temperatures at 800-1000°C. Therefore fabrication, long term stability and material costs of these conventional SOFC systems are rather high. Lowering the working temperature is required to make this promising technology commercially viable. YSZ is the standard material to be used as electrolyte in high temperature oxide fuel cells. We developed a simple method for the electrophoretic deposition of electrodes on dense electrolyte substrates. To allow significant temperature reduction new electrolyte materials with higher oxygen ion conductivity below 800°C compared to YSZ are needed. Apatite type lanthanum silicates (ATLS) are a new class of electrolytes which provides good oxygen permeability even at lower temperatures. These new electrolytes necessitate the development of suitable electrode materials. The ATLS electrolyte needs to be dense and gastight allowing only the transport of $\text{O}_2^-$ ions through the electrolyte, whereas the electrodes need to be porous in order to allow gas exchange while maintaining good adhesion to the electrolyte. Another fuel cell class which allows the reduction of the service temperature is based on the use of proton conducting ceramics and we preset the preparation of such fuel cells as well. Electrophoretic deposition of ceramic films has become an attractive alternative for the fabrication of SOFCs, due to the need to control the layer thickness by the order of microns. In this study, we present the preparation of different ceramic fuel cells by electrophoretic deposition.