Modelling of a SOFC graded cathode

Jonathan DESEURE, Laurent DESSEMOND, Yann BULTEL, Elisabeth SIEBERT.

Laboratoire d'Electrochimie et de Physico-Chimie des Matériaux et des Interfaces (LEPMI)

UMR 5631 CNRS-INPG-UJF, ENSEEG, BP 75, 38402 Saint Martin d'Hères, France.

Abstract:

One approach to improve the cathodic performances in a SOFC is to use a composite electrode which typically consists in a two phase porous mixture of a solid electrolyte (YSZ) and an electrocatalytic material (M). In our model approach, the cathode is composed of a mono-disperse porous mixture of YSZ and M spherical particles. From simulations by means of a statistical approach, the percolation rate is optimized for a compact particle stacking, a sufficient thick electrode, a volume fraction of YSZ equal to 0.5 and by grading the electrode composition for large porosity values. A one dimensional homogeneous model also predicts better cathodic performances by grading electrode composition and increasing ionic conductivity within the composite electrode.