

# Optimization of an Electrochemistry System

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## Abstract

With the development of new energy vehicles, non-conductive machining methods, and innovative instruments for treating tumors etc., electrochemistry is attracting more and more attentions for many industrial and medical application areas.

A typical electrochemical system consists of anode, cathode and electrolyte. The principle of ECM is based on electrochemical reaction taking place between electrode-electrolyte interfaces. The main study interest is to monitor or control the current density distribution along electrode surface, because the electrochemical reaction rate is determined by the current density according to Faraday's law.

In this work, optimization of a typical electrochemical system is considered, which objective is to control the current density distribution along electrode surface by inserting an insulation shield between the electrodes. The electrochemical system was modeled using the COMSOL Multiphysics® software, the moving mesh control was discussed to realize the movement of insulation shield.

## Reference

[1] M. Purcar. et al.: Optimization of the current density distribution in electrochemical cells based on the level set method and genetic algorithm, Eur. Phys. J. Appl. Phys. 56, 11302 (2011).

## Figures used in the abstract

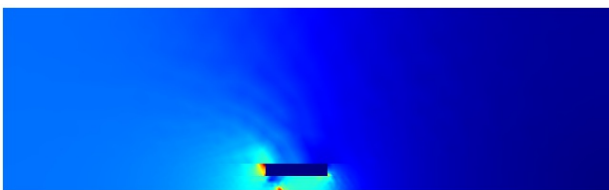


Figure 1: Current distribution at optimized position of insulating shield