Copper Electrochemical Polishing Optimisation

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Abstract

A new electrochemical polishing facility will be built at CERN to process copper radiofrequency structures and this in the framework of the Future Circular Collider study. This polishing installation will be designed and assembled so that the necessary working conditions to achieve the ultimate limits of this technique are ensured. The main working variables like potential, current density, bath fluid dynamics were thoroughly assessed to guarantee, not only, that polishing conditions were achieved inside the copper structure, but also that they were as even as possible. In this paper, it is described how copper electrochemical polishing optimization was addressed starting with laboratorial data and their use to model the process with the help of COMSOL Multiphysics®. A set of simulations, performed with COMSOL Multiphysics® to identify the best polishing parameters, are presented as well and where the final result is an optimized cathode geometry.

Figures used in the abstract

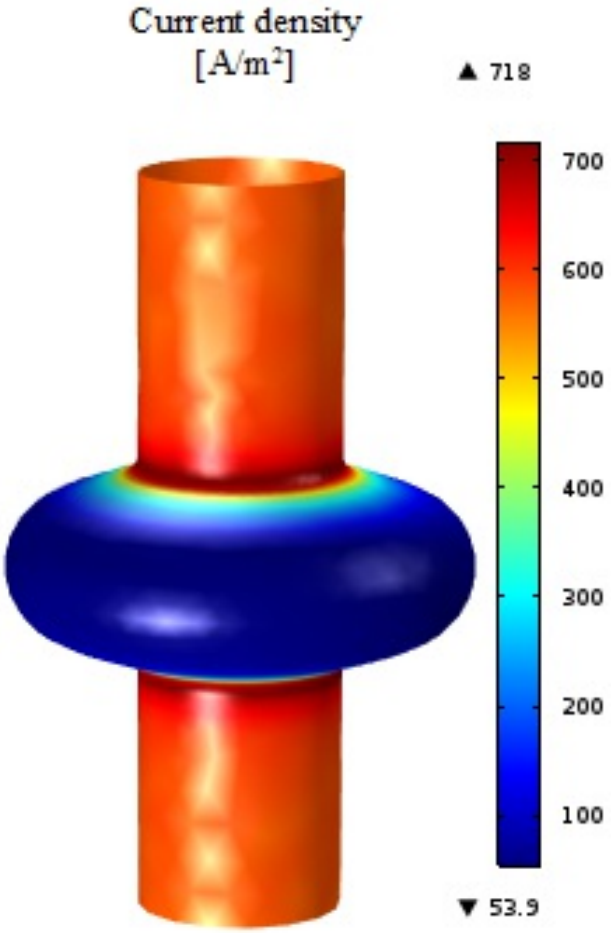

Figure 1: Output electrochemical simulation.