

M2SOEC: Modelización Multifísica de Celdas Electrolizadoras de Óxido Sólido

Description

The SIMPEL project addresses the design and development of a new generation of highly efficient solid state energy storage devices based on Solid Oxide Electrolysis Cells (SOECs) able to convert electricity into pressurized hydrogen suitable for direct injection into the grid or tank storage. SIMPEL seeks for a product-driven optimization of shapes and ceramic processing parameters to obtain solid oxide cells and short stacks able to operate at high pressure (>5 bar).

As part of SIMPEL, the M2SOEC sub-project is focused on the development of an efficient multiphysics model of SOECs to support the design and optimization activities of high-pressure solid-oxide electrolyzers. The activities in an efficient HPC-based computational framework for the study of multiphysics process in solid oxide cells using the code Alya from BSC include the transport of electrons and charge transfer chemistry along with wall functions to describe the wall surface roughness from the additive-manufacturing process, so it can be used for parametrical studies of the different SOEC designs.

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