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 devicesbased on Solid Oxide Electrolysis Cells (SOECs) able to convert electricity into pressurized hydrogen suitable for direct injection into thegrid or tank storage. SIMPEL seeks for a product-driven optimization of shapes and ceramic processing parameters to obtain solid oxidecells and short stacks able to operate at high pressure (>5 bar).

As part of SIMPEL, the M2SOEC sub-project is focused on the development an efficient multiphysics model of SOECs to support the design and optimization activities of high-pressure solid-oxidize 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 andcharge transfer chemistry along with wall functions to describe the wall surface roughness from the additive-manufacturing process, so itcan be used for parametrical studies of the different SOEC designs.

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