PRESENTER INFORMATION

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BIOGRAPHICAL SKETCH

Célia Sousa has been a Senior Researcher at Autonomous University of Madrid (UAM) since 2022. She is specialized in nanoscience and nanotechnology and her interdisciplinary research has been mainly focused on the fabrication of nanoporous materials using self-assembling methods for biomedical and fuel cells technological applications. Prior to UAM, she was postdoctoral research at Porto University in Portugal in 2013-2021 working with the self-assembling nanofabrication of magnetic and semiconductors. She did a PhD degree in Physics–Nanotechnology between Porto University (UP) and ISOLDE-CERN. During her postdoctoral period she has spent more than 1 year in an interdisciplinary research institute (INA, Spain) and she also performed several short and long stays in highly competitive and multidisciplinary international laboratories such as CERN (8 stays), Hasylab-DESY (Germany), ELECTRA (Italy), CNRS (France), and Max-Plank Institute in Berlin (Germany), UNICAMP (Brazil), UPV (Basque Country, Spain) and UCM (Madrid, Spain).

TITLE: Template-Assisted Nanofabrication of Porous Materials for Energy and Biomedical Applications

ABSTRACT

The significant advancements in nanoscience and nanotechnology over the past decade have enabled the development of new platforms where physical properties such as size, porosity, geometry, and surface functionalization can be precisely controlled at the nanoscale. Among these, self-organized nanostructuring through template synthesis has emerged as a highly promising and rapidly expanding field. This approach facilitates the creation of templates and various ordered nanostructures, ranging in size from the micrometer to the nanometer scale. Porous anodic templates made from aluminum, titanium, iron, or hafnium have proven effective not only as well-controlled nanostructured materials for direct applications but also as templates for fabricating two- and three-dimensional arrays of periodic nanostructures [1].

This presentation will highlight the latest achievements in four distinct areas of our research. First, we focus on the fabrication of nanoporous templates through the anodic oxidation of Al, Ti, Fe, and Hf metal substrates, leading to the formation of TiO_2 and α-Fe_2O_3 nanotube arrays. These structures, once converted into semiconductors, are employed as photoanodes in dye-sensitized and photoelectrochemical cells [2,3]. The second area of research, driven by the demand for higher magnetic storage capacities and more sensitive sensors, explores the intrinsic physical phenomena that arise from the size and morphology of these nanostructures, aiming to achieve precise control over their properties [4,5]. The third branch is dedicated to the development of biotechnological applications using these nanostructures [6]. Finally, we delve into the synthesis of magnetoplasmonic Janus nanostructures using the Langmuir-Blodgett technique, with a focus on their potential biomedical applications.

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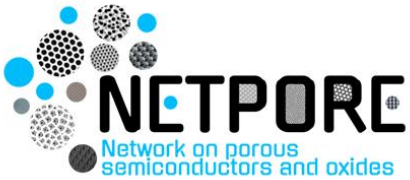
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Network on porous
semiconductors and oxides