

PhD Research Position: Atomic scale exploration of surface catalysis

Do you want to contribute to the development of advanced techniques for understanding the atomic-scale properties of catalytic surfaces? If so, join us at the University of the Basque Country (UPV/EHU) to investigate the fundamental chemical and physical characteristics of catalyst surfaces using scanning tunneling microscopy (STM) and near ambient pressure X-ray photoemission spectroscopy (NAP-XPS). Our research aims to uncover how these properties influence catalytic performance.

The PECAS Lab, located at the Faculty of Chemistry on the UPV/EHU campus in San Sebastián, Basque Country, Spain, seeks for a motivated and talented PhD researcher. This position is part of the ERC Starting Grant (ERC-StG) project "Controlling Oxygen Selectivity at the Atomic Scale" (ERC-2021-StG, COSAS, 101040193, COSAS). The project aims to establish a direct correlation between quasi-in situ surface characterization and the atomic-scale structural and electronic properties of catalysts, with an emphasis on improving reaction selectivity in water electrolysis.

Position Details:

- Duration: 3 years, with the possibility of extension for a 4th year
- Start Date: Summer 2025
- Location: Faculty of Chemistry, UPV/EHU, San Sebastián, Basque Country, Spain

Research Focus:

The core of the project involves atomic scale exploration of catalytic surfaces, such as layered materials (graphene, MoSe_2) and thin film oxides under ultra-high vacuum (UHV) conditions using scanning tunneling microscopy (STM) and spectroscopy (STS), and nc-atomic force microscopy (nc-AFM) at low temperatures (4K). These experiments will reveal the electronic and structural properties of model catalytic systems with atomic resolution, uncovering the fundamental features of individual active sites. The insights gained will be correlated with quasi-in situ near ambient pressure X-ray photoemission spectroscopy (NAP-XPS) experiments to develop a comprehensive understanding of the electrode-electrolyte interface under realistic electrochemical conditions.

The position is in the Faculty of Chemistry of the University of the Basque Country, in San Sebastián, Spain, where the candidate will be spending his/her time during the project. This position is funded by the European Union within the program "Horizon Europe" under grant ERC-2021-StG, COSAS, 101040193.



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Qualifications:

We are seeking a highly motivated candidate who meets the following qualifications:

Required:

- A Master's degree (or equivalent) in Physics, Chemistry, Chemical Engineering, or a closely related field
- Ability to work independently as well as collaboratively in an interdisciplinary team environment
- Creativity, initiative, and excellent problem-solving skills

Preferred:

- Experience with surface science tools and ultra-high vacuum technology

Benefits:

- Cutting-Edge Research: Work in a state-of-the-art laboratory equipped with advanced research facilities and opportunities for international collaboration.
- Collaborative Environment: Be part of a dynamic and multidisciplinary research team.
- Career Development: Participate in a pioneering project that addresses one of the key challenges in sustainable energy production—advancing the field of electrocatalysis.
- Transversal training: Attend to soft-skill courses to foster your career path and be involved in outreach activities to general society and scientific audiences.

How to Apply:

Applications should be addressed to Dr. Sara Barja (sara.barja@ehu.eus) and sent via email in one single PDF by March 20th, 2025. Applications must indicate the title of the position on the email subject "COSAS-PhD application":

- (i) a cover letter highlighting their interest in the position.
- (ii) curriculum vitae.
- (iii) a short description of previous research (1-2 Pages).
- (iv) the names and contact addresses (e-mail) of two academic referees.

Applications will be considered upon arrival. Please note that because of the large number of applications expected, we will not be able to give individual feedback to unsuccessful applications.

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