

Publish date: 25th of September 2026

Deadline for application: 25th of October 2026

Ref. 26/072

Project: ICREA

Area: Advanced Materials for Energy applications

Group: Nanoionics and Fuel Cells

Group leader: Dr. Albert Tarancón

PI: Albert Tarancón

“R1-PhD Position: Hydrogen Production by 3D printed Electrolyzers”

Description:

The Nanoionics and Fuel Cells Group is seeking a motivated MSc graduate to join an ambitious PhD project focused on the development of **next-generation solid oxide electrolyzer (SOEC) stacks for hydrogen and synthetic fuel production**. The research aims to exploit the unique opportunities offered by advanced ceramic additive manufacturing to overcome current limitations in high-temperature electrolysis technologies.

The PhD project will address key scientific and technological challenges in the design, fabrication and operation of **3D-printed ceramic electrolyzers**. The candidate will contribute to the development of innovative SOEC architectures that leverage additive manufacturing to create complex geometries and integrated stack components that are difficult or impossible to achieve using conventional ceramic processing routes.

A central objective of the project is the realization of SOEC stacks capable of operating under pressurized conditions, enabling more efficient hydrogen production while reducing downstream compression requirements. The research will involve the design and fabrication of ceramic components by 3D printing, optimization of functional materials and interfaces, stack assembly, and electrochemical testing under realistic operating conditions. The developed technology will also be explored for the production of synthetic fuels and other power-to-X applications.

The work will combine ceramic processing, additive manufacturing, electrochemistry, materials characterization and device engineering. The candidate will have the opportunity to contribute to the development of disruptive electrolyzer concepts that could significantly improve the efficiency, flexibility and scalability of future hydrogen production systems.

This position offers a unique opportunity to work at the forefront of sustainable energy technologies within a dynamic and internationally recognized research team with extensive expertise in solid-state electrochemical devices, ceramic manufacturing and hydrogen technologies.

We are looking for a curious, creative and proactive researcher with a strong interest in experimental science and a desire to contribute to breakthrough advances in hydrogen production and electrochemical energy conversion.

Qualifications and experience required (at the moment of start):

Essential:

The call is open to candidates of any nationality fulfilling the following criteria:

- Hold an MSc in Materials Science, Materials Chemistry, Chemistry, Physics, Chemical Engineering, Energy Engineering, or related disciplines.
- Fluent in English

Preferred:

- Hands-on experience in ceramic processing, additive manufacturing, materials synthesis or electrochemical devices.
- Knowledge of electrochemistry, solid-state ionics, hydrogen technologies, electrolyzers, fuel cells or related energy conversion systems.
- Experience with structural, microstructural, mechanical or electrochemical characterization techniques.
- Interest in hydrogen production, power-to-X technologies and sustainable energy systems.
- Familiarity with CAD tools, 3D printing technologies or advanced manufacturing processes is considered an asset.
- Basic skills in data analysis and scientific programming.
- Ability to work independently while contributing effectively to collaborative and interdisciplinary research environments.
- Strong communication and scientific writing skills.
- Previous research experience through MSc projects, internships or publications is highly valued.

Personal Skills:

- Team worker
- Initiative in research and innovation
- Flexibility
- Results-oriented
- Analytical and synthesis capabilities

Required documents:

Applicants must submit the following documents by email to irecjobs@irec.cat and atarancon@irec.cat indicating in the subject "PhD Pressurized H2 Ref 26/072":

- Curriculum Vitae, specifying the completed degree and any relevant professional experience.
- BSc and MSc transcripts.
- Motivation letter explaining interest in the project and fit with the position.

Offer of job position:

We offer a **36-month PhD scholarship**.

Salaries will follow **IREC's salary policy**, adjusted to the candidate's qualifications and experience.

The **expected starting date** is **October-November 2026**.