Institut de Materials Avançats
Universitat Jaume I
Castelló
www.inam.uji.es

1 POSTDOCTORAL RESEARCH POSITION

Job Description

Universitat Jaume I, Institut de Materials Avançats (INAM)
Location: Castelló (Spain)
Working hours: Full Time
Closing Date: March 3rd 2021
Hours of work: Full-time
Interview: Date to be confirmed
Information enquiries to: Loles Merchan (inamadmin@uji.es) including as a subject of your E-mail "SUN2CHEM job offer"

THE POST

The Project

The post is available as part of the SUN2CHEM project funded by the European Commission (H2020 Program). The objective of the project is obtaining a tandem photoelectrochemical device for the direct conversion of water and CO_2 into ethylene using exclusively solar energy. The role of the INAM-UJI team is mainly related to the preparation, characterization and optimization of the photoanode of the cell, based on multinary metal oxides. Furthermore, INAM-UJI is also responsible for a detailed analysis of carrier dynamics at interfaces with spectroscopic and photo-electrochemical tools to identify the best matching between light absorbers and catalysts along optimum working conditions. This also implies the design of the cell architecture in order to achieve a Solar to Chemical efficiency of 3%.

The Principal Investigator is Prof. Sixto Giménez, researcher at Universitat Jaume I de Castelló (Spain). His professional career has been focused on the relationship among processing, structure and properties of structural and functional materials. During his PhD thesis at the University of Navarra, he studied the relationship between processing of metallic and ceramic powders, their sintering behavior and mechanical properties. He took a Post-Doc position at the Katholiek Universiteit Leuven (2003-2006) where he focused on the development of non-destructive and in-situ characterization techniques of the sintering behavior of metallic porous materials. In 2006-2007, he was responsible for a new research line on nanostructured particulated materials for magnetic applications at CEIT (Spain). In January 2008, he joined the University Jaume I, where he is involved in the development of new concepts for photovoltaic and photoelectrochemical devices based on nanoscaled materials, particularly studying the optoelectronic and electrochemical responses of the devices. He has co-authored more than 100 scientific papers in international journals and has received more than 6000 citations. He has edited a reference book on photoelectrochemical solar fuels production. His current h-index is 40.

The project requires a multidisciplinary approach from the synthesis of materials to the structural, chemical and photoelectrochemical characterization of materials and final devices, including also an important feedback from theoretical analysis of materials and interfaces. We encourage applications from researchers with high-level skills directly relevant to the synthesis and characterization of multinary metal oxides, water splitting and CO_2 reduction catalysts and optoelectronic devices prepared with them, who can make a strong contribution to the project. Specific skills required for the postdoc position are:

Postdoc position:

- Synthesis of materials (especially multinary metal oxides, etc…).
- Experience in thin film deposition by different techniques (especially solution techniques).
- Fabrication of photoelectrochemical devices.
- Experience in optical characterization of solutions and thin films (absorption, photoluminescence, time resolved photoluminescence, transient photocurrent and photovoltage decay...).
- Experience in photoelectrochemical characterization of electrodes (cyclic voltammetry, impedance spectroscopy,…).
- Experience in structural characterization of thin films (XRD, SEM, EDX, AFM, KPFM, FT-IR, Raman,…).
- Experience in gas and liquid chromatography (GC and HPLC) and nuclear magnetic resonance.

General skills and characteristics are:

- Capability for autonomous elaboration of scientific manuscripts.
- Capability of supervision of PhD students.
- Demonstrated ability to take ownership and responsibility for projects
- High scientific motivation.
- Excellent publication record.
- Excellent interpersonal and communication skills
- Proven teamwork experience and efficient collaboration skills
- Fluent in English

The Postdoc will advise the rest of group members, take part in discussions to agree targets for their work, and supervise their day-to-day laboratory activity under risk assessments agreed with Prof. Sixto Gimenez. Your work will be directly supervised by Prof. Sixto Gimenez.

It is important to note that this is not an exclusive list. If you have relevant experience and a strong track record (*e.g.,* publications and/or patents) in a related area, you are encouraged to apply and state how you would contribute to the project. Expertise in more than one area is desirable. ***However, we are looking for a team of the best people who can apply their skills to the project, not to fill a restrictive skills list.***

In all the cases, you will pro-actively progress your project, using your own initiative, knowledge and extensive discussion with the group members. You will be responsible for day-to-day decisions regarding the project. It is expected that you will be an innovative individual with an interest in applying your research skills to a challenging project – this will require daily decision making in terms of determining the best approaches to solve a particular research problem. There is a specific requirement to work closely with other researchers with different skills to yours. There are project meetings about every 1-2 weeks at which presentations concerning recent results and future plans are made. The role may require work off-site (*e.g.,* at international or national facilities, or at collaborator sites).

HOSTING ARRANGEMENTS

Training and career development at **Institute of Advanced Materials (INAM)** as part of the University Jaume I (Castellón, Spain) is central to its culture of encouraging both learning and knowledge transfer to its user communities. Over the last 5 years (2016-2020) **INAM** has trained over *48 people* including 12 *PhD* and *31 Post-docs*. As a complement to the training activities regulated by master's and doctoral studies, the members of the unit have organized courses of specialization in specific subjects that could have impact in scientific and technological fields, or in the training of experts. On the other hand our groups have been organizing numerous international schools and workshops. After the University Master's Degree, the students can entry in different *doctoral programs* at **UJI**. The purpose of these programs is to provide doctoral students the capacity for autonomous research in different fields, for which it is required to perform first a series of training tasks aimed at enhancing the capabilities required for the realization of the doctoral thesis. Achieving the doctoral degree ensures adequate training to carry out research in the public sector and private industry. In the period 2015-2020, 12 *PhD theses*, with at least one PI of the unit as supervisor, were defended. Most of these Doctors continue nowadays a research carrier. Their training during their PhD allows them to obtain postdoctoral positions in important international labs around the world.

FACILITIES

INAM main equipment comprises the required facilities for the fabrication and characterization of the novel materials and devices, including a Kelvin Probe, six potentiostats with impedance analyzers, two solar simulators, a climatic chamber, two UV/VIS spectrometers, two fluorimeters and two IPCE systems. Moreover, two gas chromatographs, one of them fitted with a mass spectrometer to carry out the analysis of products of catalytic reactions. The UJI central research services also provides further equipment to analyze the structure of the materials: a BET porosimeter, two scanning electron microscopes (SEM) and a transmission electron microscope (TEM), all of them fitted with Energy Dispersive Spectrometers (EDS) for chemical analysis, an atomic force microscope (AFM), an optical microscope (OM), X-Ray diffractometers for polycrystalline and monocrystalline samples (XRD), mechanical and optical profilometers, temperature controlled impedance spectroscopy analyzer, two nuclear magnetic resonance devices (300 and 500 MHz), Raman and infrared spectrometers, an ICP-MS equipment for elemental and isotopic analysis, and a nanosecond laser for transient spectroscopy. All the equipment above described is used by the experienced researcher on his own, with help from his supervisor or by technicians in charge. It stands out, the experienced researcher is familiar with the vast majority of the equipment.

The UJI also counts on transversal infrastructures such as UJI prestigious library, which manages specialized library collections and it makes great emphasis of the use of **"open access".** The host institution aims to give an unbeatable deal to the researcher, therefore the UJI supports the general principles specified in both the European Charter for Researchers and the Code of Conduct for the Recruitment of Researcher. The Human Resources Service helps to the researcher to settle into their new host country by providing advice on issues such as salaries and taxation, social security, work permits and health care.

CITY OF CASTELLÓN

In Castellón, everything is nearby. In our city, the smell of oranges still surrounds the city streets and the orchards are still present in the settlement. Castellón is the capital city of la Plana Alta and stills preserves the quiet and friendly character of working environments. The urban has around 180.000 inhabitants and it is possible to distinguish between the historic center, the new neighborhoods, and the maritime district known as el Grao.

The climate is generally excellent that is always an advantage. In the city center the cultural and commercial life – completely Mediterranean – allows seeing a joyful and lively city. The historic center which still conserves the shape of a Roman camp houses the city's emblematic monuments. This primitive core rose from the ancient Arab farms after the Town Charter provided by Jaume I in the XIII century. On the city's outskirts, cultural and sports facilities have been developed. Between the primitive core and the sea stands the maritime district, El Grao where all the nautical activities take place.

The urban ensemble from Castellón is only understood considering the modern mentality and international outlook of its inhabitants. There is, and there has always been a continue desire of being updated and open to visitors. And that is what is offered along with other variety of attractions such as the sea, orchards, monuments, culture, nature, festivals, and so on.

Quality of life in Castellón is an strong asset, comparison in terms of cost of living can be evaluated in https://www.numbeo.com/cost-of-living/in/Castellon-De-La-Plana-Spain