

Research Associate in Redox Chemical Processing

Job Ref: REQ250923

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.

The Wolfson School of Mechanical, Electrical and Manufacturing is one of the leading Engineering Schools in the country. With a strong tradition in Manufacturing and in the discovery and application of Materials for applications in a broad range of industrial sectors (e.g., electronics, bioengineering & healthcare, automotive, food industry, etc), we strive for academic excellence and research at the leading edge.

Project Description

The project entails the preparation of experiments employing design and analytical tools for the study of redox reactions and electron transfer. Additionally, it involves the characterisation of oxidation and reduction reactions of a chemical etchant with titanium alloy surfaces. The successful candidate must demonstrate a keen interest in applying their existing skill set to the comprehension of chemical oxidation and reduction (redox) reactions and etching mechanisms. Measurement and analytical techniques, such as volt and pH metering, spectrometry, ion chromatography, and titrations, will be employed to identify and quantify cations, ions, and complexes in aqueous solutions. The outcomes obtained will be instrumental in supporting the development of enhanced etching processes that enable the tailored modification of surface chemistry in titanium alloys. Characterisation of the substrate surface will be conducted using both optical and electron microscopes, as well as chemical analysis employing X-ray methods, including XRD and XPS. The post holder is expected to undertake data analysis of experimental outcomes, visualisation of data, and the authorship and co-authorship of quality publications to disseminate the findings effectively.

Key Requirements:

- Previous knowledge of redox reactions, and how to determine oxide states, electron transfer and understanding and creation of Pourbaix diagrams for such reactions.
- Demonstrated experience working with redox reactions, in particular using inorganic chemicals and metals.
- Working knowledge of chemical etching or electrochemistry reactions.
- Demonstrated experience working in a lab, including the handling of chemicals and the preparation of risk assessments and COSHH forms to ensure a safe handling and use of the chemicals
- Experience working with modelling tools to visualise and predict redox reactions, and analytical techniques.
- Experience of acquiring and analysing data derived from measurement and analytical techniques (to identify and quantify ions, cations or complexes).
- Experience of deriving experimental designs and protocols
- Demonstrate excellent communication and interpersonal skills
- Willing to work as part of a team, as well as independently, showing initiative and leadership to support others and/or identify areas where the successful candidate needs support from others
- Demonstrate excellent self-management and organisational skills, given the nature of the experiments, as well a committed approach to work
- Have a PhD degree (or close to completion) in a related subject or equivalent experience or equivalent industrial experience.

Job Description

Job Grade: Specialist and Supporting Academic Research Grade 6

Job Purpose

To conduct research in the fields of chemistry, redox reactions, and electrochemistry, employing inorganic etchants to investigate the surface modification of titanium and titanium alloys. To apply fundamental principles of chemistry and physics to characterise the etching behaviour of oxidising agents on titanium surfaces. To measure and analyse aqueous solutions to identify and quantify the presence of cations, ions, and complexes. To enhance our existing knowledge of the practical application of etchants on titanium surfaces. To generate high-quality scientific reports and papers suitable for publication in international journals.

Job Duties

- To design and perform experiments, use characterisation techniques, analyse results and visualise data with scientific rigour and of publishable quality.
- To conduct research of academic rigour and scientific standard, carry out authoritative literature reviews, and publish in top quality journals, consistent with the School's and Research Lab's quality and ambition.
- Write up regular progress reports and present outcomes to all Investigators and Collaborators (incl. those located at other Institutions), making recommendations for next steps.
- To work as part of a multi-disciplinary, multi-location team that addresses different aspects of the design, manufacturing, validation cycle of porous materials and structures.
- To attend and contribute to conferences, seminars, webinars and other events of interest to the team.
- To contribute to project promotion and public engagement events.
- To contribute ideas for new research and impact directions.
- To always maintain confidentiality and ensure that intellectual property (IPR) generation is safeguarded, and agreements are not violated.
- To assist the academic staff in the project team with the supervision of undergraduate, MSc or PhD project work and day-to-day supervision and support of other researchers.
- To engage in training programmes in the University (or elsewhere) that are consistent with the needs and aspirations of the project and those of the Lab.
- To undertake other duties as may be reasonably requested and that are commensurate with the nature and grade of the post.

Points To Note

The purpose of this job description is to indicate the general level of duties and responsibility of the post. The detailed duties may vary from time to time without changing the general character or level of responsibility entailed. Training will be provided as necessary and in support of the Researchers' professional development, and an attitude for learning will be an essential criterion in the selection of a successful candidate.

Special Conditions

All staff have a statutory responsibility to take reasonable care of themselves, others and the environment and to prevent harm by their acts or omissions. All staff are therefore required to adhere to the University's Health, Safety and Environmental Policy & Procedures.

All staff should hold a duty and commitment to observing the University's Equity & Diversity policy and procedures at all times. Duties must be carried out in accordance with relevant Equity & Diversity legislation and University policies/procedures.

Successful completion of probation will be dependent on attendance at the University's mandatory courses which include Belonging and Inclusion and, where appropriate, Recruitment and Selection.

Organisational Responsibility

Reports to Prof Carmen Torres-Sanchez and Prof Paul Conway, Principal Investigators on the Grant.

Person Specification

Your application will be reviewed with respect to meeting the essential and desirable criteria listed below.

Applicants are strongly advised to explicitly state and evidence how they meet each of the essential (and desirable) criteria in their application, giving examples of recent experience. You may use the **STAR** approach: explain what the **Situation** was, which **Task** you had to do or were allocated, what **Action** you took, what you did and a justification, and what was the **Result**. It is highly recommended that the candidates express in their Cover Letter how they fit to the Job Purpose and Job Duties described above. Stages of assessment are as follows:

- 1 – Application
- 2 – Test/Presentation
- 3 – Interview

Essential Criteria

Area	Criteria	Stage
Experience	Experience within a high-quality research or development environment	1, 3
	Authoring original work for academic journal papers, conference papers or technical reports	1
	Experience of working in a chemistry laboratory environment	1, 3
	Experience dealing with chemicals in a lab environment, including knowledge of Health & Safety procedures, risk assessments, COSHH forms, safe disposal routes, etc	1, 3
	Experience of redox reactions or electrochemical cells	1, 3
	Experience of measurement and analytical techniques including (but not limited to) pH meters, voltmeters, spectrometry, chromatography, etc, and titration techniques to determine content and concentration of dissolved species (esp. ions and cations, or complexes)	1, 3
	Experience of acquiring and analysing data statistically derived from analytical techniques	1, 3
	Experience of microscopy (optical and SEM) and chemical characterisation (e.g. XRD, XPS or others) of (metal) surfaces	1, 2, 3
	Experience of deriving experimental designs and protocols	1, 3
	Demonstrate excellent communication and interpersonal skills	1, 3
	Demonstrate excellent self-management and organisational skills, given the nature of the experiments, as well a committed approach to work	1, 3
Skills and abilities	Ability to organise resources to support and further own research activities within the scope of their work	1, 3
	Ability to plan own workload in accordance with the overall project objectives and work independently to meet deadlines	2, 3
	Excellent written and oral communication skills in English	1, 2, 3
	Excellent interpersonal and organisational skills	1, 3
	Ability to write project reports and make technical presentations to industrial and academic research groups	1, 3
	Knowledge of relevant Health & Safety issues	1, 3
Training	Evidence of having undertaken further training and a willingness to be trained if necessary to fulfil the requirements of the job	1, 3

Qualifications	PhD in Inorganic/Physical Chemistry/Electrochemistry or Materials Sciences (or close to completion) or equivalent industrial experience	1
Other	Commitment to observing the University's Equal Opportunities policy at all times.	3

Desirable Criteria

Area	Criteria	Stage
Experience	Working knowledge of potentiometric titrations and chemometric analysis	1, 3
	Working with or operating electrochemical cells	1, 3
	Knowledge of metal surfaces esp. titanium alloys metallurgy	1, 3
	Working knowledge of modelling tools for such as Pourbaix diagrams for redox reactions	1, 3
Skills and abilities	A self-starter who can operate effectively with minimal supervision, liaising with members of the team on own initiative	3
	Presentation skills of technical and non-technical aspects of the project to various audiences (i.e. academic and industrial collaborators, and general public dissemination of results and impact)	1,3
Other	Able to travel to academic and industrial collaborators' sites	1, 3

Conditions of Service

The position available is full or part time and fixed term for 12 months with a possibility for an extension on the basis of a mid-term review of the Grant that will inform future research directions. Salary will be on Specialist and Supporting Academic Research Grade 6 £35,608 - £46,049 at a starting salary to be confirmed on offer of appointment.

The appointment will be subject to the University's normal Terms and Conditions of Employment for Academic and Related staff/Operational and Administrative staff, details of which can be found [here](#).

The University is committed to enabling staff to maintain a healthy work-home balance and has a number of family-friendly policies which are available at <http://www.lboro.ac.uk/services/hr/a-z/family-leave-policy-and-procedure---page.html>.

We also offer an on-campus nursery with subsidised places, subsidised places at local holiday clubs and a childcare voucher scheme (further details are available at: <http://www.lboro.ac.uk/services/hr/a-z/childcare-information---page.html>)

In addition, the University is supportive, wherever possible, of flexible working arrangements and dynamic working when the tasks and assignments of the project can permit it.

We also strive to create a culture that supports Equity and celebrates diversity throughout the campus. The University holds a Bronze Athena SWAN award which recognises the importance of support for women at all stages of their academic career. For further information on Athena SWAN see <http://www.lboro.ac.uk/services/hr/athena-swan/>