



University of
Sheffield

A Remarkable
Place to Work

Research Associate in Mechanical Properties of Battery Materials

Faculty of Engineering,
Department of Materials Science &
Engineering

Overview

We have an exciting opportunity in the Department of Materials Science and Engineering for a Research Associate who will work on a Faraday Institution funded project, 'FutureCat', to develop cathode materials for next generation lithium batteries. Working with Prof Beverley Inkson and Dr Innes McClelland you will contribute to a project involving the synthesis, structural characterisation and property measurement of battery materials.

This position is part of a close collaboration between the Department of Materials Science and Engineering and co-investigators from across five institutions in a joint project led by Prof. Serena Corr at the University of Sheffield.

The successful candidate will use expertise in mechanical properties and advanced microscopy to analyse a range of battery materials based on complex metal oxides fabricated within the FutureCAT consortium using a range of advanced particle consolidation techniques. Specifically a range of advanced characterisation methodologies including micromechanical testing, electron microscopy, and X-ray tomography will be used to carry out detailed evaluation of 3D electrode microstructure, defect content and mechanical properties/resilience for a range of cathode materials with novel compositions/cation-ordering patterns and electrochemical histories.

The successful candidate will have previous experience and expertise in micromechanical testing and scanning electron microscopy methods. Desirable skills will be in transmission electron microscopy, X-ray/FIB Tomography, and/or battery microstructures. Any additional training can be provided across the consortium in this large, multi-institutional project.

The candidate will join a team of researchers within Sheffield working closely with the University of Cambridge as part of the FutureCat project, and will collaborate across the wider Faraday Institution funded Project with the Universities of Oxford, Lancaster and UCL and the ISIS Neutron and Muon Facility. The successful candidate will liaise with project partners to bring together advanced processing, property measurement and characterisation of the novel cathode systems. Previous experience of battery materials and testing may be advantageous, but is not a requirement and your skills will be developed by interactions within the project consortium. Applications are strongly encouraged from candidates who come from outside the energy materials area who can apply their skills in mechanical testing to benefit the challenges of battery materials development.

The successful candidate will be expected to contribute to the formulation and submission of research publications and research proposals as well as help manage and direct this complex and challenging project as opportunities allow.

This position is available at the University of Sheffield from 1st June 2023 until 30th September 2024 and may be extended subject to project funding.

The Faraday Institution has been established to provide incisive direction for the development of battery research in the UK, with significant value placed on the inclusion of research groups with varied expertise in order to tackle the challenges provided by the advancement of battery technologies to meet the mounting environmental challenges that we currently face. This role is based within the FutureCat project to develop next generation cathodes for lithium ion batteries. We aim to provide a fast paced, dynamic and collaborative approach to research with a significant focus on providing training to produce the next generation of leaders within the field of battery research. The Faraday has a strong commitment to equality, diversity and inclusion with the recently formed EDI working group aiming to provide an environment where everyone feels valued, can contribute fully and thrive. We believe diversity in all its forms delivers greater impact through

research, teaching and student experience.

Applicants who meet the essential criteria and who have a disability will automatically be offered an interview.

Person Specification

You should provide evidence in your application that you meet the following criteria. We will use a range of selection methods to measure your abilities in these areas including reviewing your online application, seeking references, inviting shortlisted candidates to interview and other forms of assessment action relevant to the post.

The University of Sheffield is proud to be a Disability Confident Employer, we commit to recruit and retain disabled applicants and support positive action. We encourage disabled people to apply for our jobs and to have the opportunity to demonstrate their skills, talent and abilities at the interview stage. We commit to offer an interview to disabled applicants who meet the minimum criteria for the job. For further information on the Disability Confident Scheme, please follow the [link](#).

Criteria		Essential	Desirable
1.	PhD in a relevant subject or a cognate discipline, or equivalent	X	
2.	Specialist practical knowledge of mechanical properties, micromechanical testing and degradation of materials	X	
3.	Knowledge of crystallography and defect analysis	X	
4.	Knowledge of specialist IT software (e.g. data manipulation and processing, image analysis, tomography reconstruction) as appropriate	X	
5.	A comprehensive and up-to-date knowledge of the wider material microstructure subject area	X	
6.	Knowledge of battery electrode materials		X
7.	Knowledge of advanced transmission electron microscopy methods and their application to defect characterisation		X
8.	Knowledge of Ion/X-ray tomography for analysis of chemistry and microstructure		X
9.	Research creativity and cross-discipline collaborative ability as appropriate.	X	
10.	Excellent communication skills (oral and written), including public presentations and ability to communicate complex data/concepts clearly and concisely	X	
11.	Extensive IT and data analysis/interpretation skills as appropriate	X	
12.	A track record of presentation and publication of research results in quality journals/conferences	X	
13.	Ability to work effectively both under own initiative and within a team	X	
14.	Ability to independently develop creative approaches to problem solving	X	
15.	3-4 years relevant research experience (or equivalent) appropriate to an early career researcher		X
16.	Ability to assess and organise resources, and plan and progress work activities	X	

About the Team

The Department of Materials Science and Engineering (MSE) at The University of Sheffield (TUoS) is one of the national leaders in the field, with the Faculty of Engineering, TUoS having 95% of REF2021 submissions ranked as world-leading or internationally excellent. MSE is a major partner in the £235M Henry Royce Institute for Advanced Materials and hosts the £30M materials discovery centre, and the £8M materials translational centre. These state-of-the-art facilities, including world class Electron, Ion and X-ray Microscopies, allow fundamental materials science to be translated to future materials manufacturing technologies.

MSE currently has 42 academic staff including 20 Professors, 6 Readers, 9 Senior Lecturers and 7 Lecturers. One of seven Departments in the Faculty of Engineering, the Department of Materials Science and Engineering is growing rapidly, and currently has 70 postdoctoral research staff and 208 PhD students. The Department holds an Athena Swan Silver award for commitment to advancing women's careers in science, technology, engineering, math, and medicine, and has received a gold award for Green Impact. MSE's teaching is underpinned by world-leading research and facilitated by world-class facilities.

For further information, please visit:

<https://www.sheffield.ac.uk/materials/index>

Facebook <https://www.facebook.com/msesheffield>

Follow us on Twitter [@msesheffield](https://twitter.com/msesheffield)

Job Description

Main Duties and Responsibilities

Perform the following activities in conjunction with and under the guidance of the Principal/Co Investigator:

- Plan and conduct assigned research individually or jointly in accordance with the project deliverables and project research strategy.
- Contribute to the acquisition, set up, maintenance and integration of experimental apparatus and analysis strategies.
- Document research output including analysis and interpretation of all data, maintaining records and databases, drafting technical/progress reports and papers as appropriate.
- Develop and enhance your research profile and reputation and that of The University of Sheffield and the Faraday Institution, including contributing to publications of international quality in high profile/quality refereed journals, and enhancing the research impact in terms of economic/societal benefit.
- Contribute to the presentation of work at international and national conferences, at internal and external seminars, colloquia and workshops to develop and enhance our research profile.

- Contribute to the identification of potential funding sources and to assist in the development of proposals to secure funding from internal and external bodies to support future research.
- Collaborate with colleagues and participate in team/group meetings/seminars/workshops across research groups in the Departments of Materials Science and Engineering and FutureCAT colleagues and the wider community (e.g Academic and Industrial Partners).
- Contribute to the organisation, supervision, mentoring and training of undergraduate and/or postgraduate students and less experienced members of the project team to ensure their effective development.
- Perform administrative tasks related to the activities of the research group
- Be responsible for safety management related to the organisation and running of Laboratory and/or Experimental techniques, equipment and processes as appropriate.
- Keep up to date with current knowledge and recent advances in the field.
- Engage in personal, professional and career development to enhance both specialist and transferable skills in accordance with desired career trajectory.
- Perform the above duties with a higher degree of independence, leadership and responsibility, particularly in relation to planning, funding, collaborating and publishing research, and mentoring colleagues.
- Establish and sustain a track record of independent and joint published research to establish and maintain your expert reputation in the subject area.
- Survey the research literature and environment, understand the research challenges associated with the project and subject area, and develop/implement a suitable research strategy.
- These key tasks are not intended to be exhaustive but simply highlight a number of major tasks which the staff member may be reasonably expected to perform.
- Any other duties, commensurate with the grade of the post.

Reward Package

Terms and conditions of employment: Will be those for Grade 7 staff.

Salary for this grade: £36,333 - £44,414 per annum pro-rata.

This post is fixed-term with an end date of 30.09.2024.

This post is full-time:

This role has been identified as a full-time post, but we are committed to exploring flexible working opportunities with our staff which benefit both the individual and the University. Therefore, we would consider flexible delivery of the role subject to meeting the business needs of the post. If you wish to explore flexible working opportunities in relation to this post, we encourage you to call or email the departmental contact listed below.

We are a campus based residential university and as such the expectation is that all staff will spend some of their time on campus. The university is committed to allowing its employees to work to a hybrid model with a combination of working on campus and remotely, where possible. This role has been identified as a role that could work to the hybrid model and if successful your manager will discuss these informal arrangements with you.

If you join the University you will have access to a Total Reward Package that includes a competitive salary, a generous Pension Scheme and annual leave entitlement, as well as access to a range of learning and development courses to support your personal and professional development. You will have access to your own personalised portal where you can also access a comprehensive selection of benefits and offers to suit your changing lifestyle needs, for example financial wellbeing, travel options, shopping and cinema discounts.



The University is committed to tackling the global climate emergency. Our sustainability strategy forms an integral part of all we do. We strive to embed this in all areas of university life, from our students' education, the globally impacting international research we contribute, to campus life.



We aim to empower staff to work sustainably by giving them the knowledge to make ethical decisions at work and home. Staff have the opportunity to be involved in impactful sustainability projects through the nationally recognised Green Impact scheme.

Staff have access to excellent green benefits including the cycle to work scheme with discounts and free secure bike storage, as well as many greener choices across campus.

If you have an interest in this area, the university will strive to passionately support you in these commitments. Check out www.sheffield.ac.uk/sustainability for more information.

The University of Sheffield recognises the importance of creating a positive environment, whereby all staff feel able to talk openly and with trust about wellbeing and mental health.

Our Staff Wellbeing offer, encourages and supports staff to maintain their own positive health and wellbeing through a range of accessible, inclusive and supportive services and activities.

Our leadership development has been designed to ensure that our leaders have the knowledge, skills and behaviours needed by the University.

Inclusion at Sheffield is everyone's responsibility. Our vision is to build a University community that actively attracts, engages and develops talented individuals from many different backgrounds.



We are proud of our award-winning equality, diversity and inclusion action, and we continue to work to create a fully inclusive environment where everyone can flourish.

To find out more about the benefits of working at the University, visit www.sheffield.ac.uk/jobs/benefits

Selection – Next Steps

Closing date: For details of the closing date please view this post on our web pages at www.sheffield.ac.uk/jobs

Following the closing date, we will contact you by email to let you know whether or not you have been shortlisted to participate in the next stage of the selection process. Please note that due to the large number of applications that we receive, it may take up to two working weeks following the closing date before the recruiting department will be able to contact you.

Full details of the selection process will be provided to invited candidates.

For more information on our application and recruitment processes visit www.sheffield.ac.uk/jobs/application-tips

Informal enquiries

For informal enquiries about this job and the recruiting department, contact: Professor Beverley Inkson on beverley.inkson@sheffield.ac.uk

For administration queries and details on the application process, contact the lead recruiter: Mrs Amanda Temple on mse-postaward@sheffield.ac.uk

For all online application system queries and support, visit: www.sheffield.ac.uk/jobs/faqs

Creating a remarkable place to work

We build teams of people from different heritages and lifestyles from across the world, whose talent and contributions complement each other to greatest effect. We believe diversity in all its forms delivers greater impact through research, teaching and student experience.

We are consistently ranked in the top 100 of the world's universities, but there's so much more to us than that. By joining the University, you will be joining award-winning teams and departments who are all working together to make the University of Sheffield a remarkable place to work.