DEPARTMENT OF MATERIALS

Job Description and Selection Criteria

Summary

Job title	Postdoctoral Research Assistant in the Manufacture of Next Generation Battery Electrodes
Division	MPLS
Department	Department of Materials
Location	Department of Materials, Begbroke Science Park, Oxford
Grade and salary	Grade 7: £36,024- £44,263 per annum with a discretionary range to £48,350
Hours	Full time
Contract type	Fixed term until 31 March 2026 (with potential for extension)
Reporting to	Professor Patrick Grant
Vacancy reference	179431

Research topic	Manufacture of solvent-free lithium-ion battery electrodes
Principal Investigator / supervisor	Professor Patrick Grant
Project team	Processing of Advanced Materials
Project web site	https://pam.web.ox.ac.uk/
Funding partner	The funds supporting this research project are provided by the Faraday Institution

The Department of Materials has been awarded departmental Bronze Athena SWAN status in recognition of its efforts to introduce organisational and cultural practices that promote gender equality and create a better working environment for both men and women. Job applications are particularly welcome from women and black and ethnic minority candidates, who are under-represented in research posts in the Department.

Work/life balance

The Department of Materials is actively promoting the provision of a family friendly working environment and together with the University of Oxford recognises the demands of work/life balance. Therefore for this project we encourage applications from candidates who wish either to hold these positions on a full time, or part time basis or need flexibility in their working hours and will discuss these opportunities with shortlisted applicants at interview.

The role

This post is funded by research grant “Next Generation Electrodes (Nextrode)” that is provided by the Faraday Institution, the UK’s independent institute for electrochemical energy storage research and skills development, to an Oxford-led group of collaborating universities. The Faraday Institution’s vision is to bring together scientists and industry partners on research projects that reduce battery cost, weight, and volume, and improve performance and reliability (faraday.ac.uk). The post will start as soon as possible and is focused on the solvent-free manufacture of Li ion battery electrodes.

The overall aim of the Nextrode project is to seize the emergent opportunity in the manufacture of smart electrodes based on improved scientific insight and the invention and development of the next generation of novel electrode manufacturing processes. Across the Nextrode consortium, the research involves elements of design, modelling, manufacture, characterisation and data science.

Nextrode is led by Professor Patrick Grant in the Department of Materials at Oxford University, and alongside researchers from the Department of Engineering Science and the Mathematical Institute at Oxford, involves close collaboration with leading researchers from the universities of Birmingham, Sheffield, Southampton, Warwick, Imperial College London and University College London. The university research is supported by strategic industrial partners.

The post holder will join the Processing of Advanced Materials (https://pam.web.ox.ac.uk/) group, reporting to Professor Patrick Grant, and to others with responsibility for project leadership and management. The research work will focus on the design, development and detailed investigation of solvent-free approaches to the fabrication of electrodes for Li ion batteries. Core to the research is establishing new manufacturing capabilities, commissioning new equipment, developing new methodologies and processing protocols, and exploring in detail the resulting electrode microstructure and electrochemical performance. The scope encompasses both cathode (LFP, NMC) and anode (graphite, graphite + Si) chemistries. The work will be primarily experimental focused on process development, electrode manufacture and performance assessment, but depending on the skills of the successful applicant, may also involve some aspects of modelling or data science.

The appointed person will collaborate with other researchers and technicians in the group, elsewhere within the Department and the University, and across the Nextrode consortium including industrial partners.

Responsibilities

The person appointed to this post will be an experimental scientist/engineer with experience in the fabrication of energy storage materials, electrodes, and/or energy storage devices and their microstructural and electrochemical characterisation. In order of priority:

- The development, investigation and optimisation of solvent-free manufacturing processes for the fabrication of electrodes and devices for electrochemical energy storage.
- Structural characterisation of particulate materials and electrodes, for example, using focused ion beam sectioning, electron microscopy, X-ray tomography, porosimetry, etc.
- Electrochemical characterisation of electrode energy storage behaviour using cyclic voltammetry, galvanostatic charge/discharge, impedance analysis, etc.
- Close collaboration with team members in Oxford and at other partners, including the sharing of progress and data, pooling of ideas, helping and assisting one another, preparation of joint papers and presentations, etc.
- Preparation of high-quality research papers in English for the international scientific literature and conferences; the preparation and delivery of presentations to the project team; the recording of progress in a lab-book in English according to standard laboratory practice, the identification and recording of new intellectual property according to University practices.
- A proactive and action-oriented approach to health and safety that contributes to a continuously improving research environment.
- Assisting with training and supervision of doctoral students.

Other occasional duties:

- If required, supporting the Head of Department and Director of Studies in the provision of teaching for the Department's undergraduate and postgraduate degree students, for which ad hoc payments may be made. This may include, but is not restricted to, the delivery of lectures, practical demonstrations, tutorials, classes, and/or workshops and any associated responsibilities or administrative tasks (including the setting of examination questions). The post holder will not be expected to provide more than four hours of such tasks (on average) per week during academic term.
- Assisting with other reasonably practical and administrative duties as required.

Selection criteria

Essential selection criteria

- Hold a PhD/DPhil (or be close to completion) in materials science, other physical science or relevant engineering discipline.
- Experimental, hands-on experience in the **manufacture and fabrication of battery electrodes** and/or devices.
- Experimental, hands-on experience in materials and/or device characterisation, especially focused ion beam milling and scanning electron microscopy, X-ray tomography, and surface area analysis, etc.

- Experimental, hands-on experience in the electrochemical characterisation of electrode materials and devices using cyclic voltammetry, galvanostatic charge/discharge, impedance spectroscopy, etc.

- A strong publication record, commensurate with experience, in peer-reviewed journals.

- Excellent oral and communication skills, including the proven ability to write in English at a suitable standard for the preparation of written reports, publications and presentations of the work at generalist and specialist levels, including discussions with collaborators and scientists in different fields.

- Well-organised and self-motivated with the ability to manage the day-to-day running of a research project, to identify research objectives and to carry out appropriate research activities within a given timescale.

Desirable selection criteria

- Experimental experience in the design and/or development of novel equipment and techniques, especially related to additive or other type of manufacturing.

- Experience of working in larger research teams, across different institutions, as well as interactions with commercial suppliers, external sponsors, etc.

- Experience and interest in the supervision and training of junior researchers.

Pre-employment screening

Standard checks

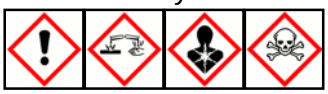
If you are offered the post, the offer will be subject to standard pre-employment checks. You will be asked to provide: proof of your right-to-work in the UK; proof of your identity; and (if we haven't done so already) we will contact the referees you have nominated. If you have previously worked for the University we will also verify key information such as your dates of employment and reason for leaving your previous role with the department/unit where you worked. You will also be asked to complete a health declaration so that you can tell us about any health conditions or disabilities for which you may need us to make appropriate adjustments.

Please read the candidate notes on the University's pre-employment screening procedures at: https://www.jobs.ox.ac.uk/pre-employment-checks

Hazard-specific / Safety-critical duties

This job includes hazards or safety-critical activities. If you are offered the post, you will be asked to complete a health questionnaire which will be assessed by our Occupational Health Service, and the offer of employment will be subject a successful outcome of this assessment.

The hazards or safety-critical duties involved are as follows:

- Working with Ionising Radiation
- Work with any substance which has any of the following pictograms on their MSDS: 
- Travel outside of Europe or North America on University Business

About the University of Oxford

Welcome to the University of Oxford. We aim to lead the world in research and education for the benefit of society both in the UK and globally. Oxford's researchers engage with academic, commercial and cultural partners across the world to stimulate high-quality research and enable innovation through a broad range of social, policy and economic impacts.

We believe our strengths lie both in empowering individuals and teams to address fundamental questions of global significance, while providing all our staff with a welcoming and inclusive workplace that enables everyone to develop and do their best work. Recognising that diversity is our strength, vital for innovation and creativity, we aspire to build a truly diverse community which values and respects every individual's unique contribution.

While we have long traditions of scholarship, we are also forward-looking, creative and cutting-edge. Oxford is one of Europe's most entrepreneurial universities and we rank first in the UK for university spin-outs, and in recent years we have spun out 15-20 new companies every year. We are also recognised as leaders in support for social enterprise.

Join us and you will find a unique, democratic and international community, a great range of staff benefits and access to a vibrant array of cultural activities in the beautiful city of Oxford.

For more information, please visit www.ox.ac.uk/about/organisation.

Mathematical, Physical and Life Sciences Division

The Mathematical, Physical, and Life Sciences (MPLS) Division is one of the four academic divisions of the University. Its nine academic departments span the full spectrum of the mathematical, computational, physical, and engineering and life sciences, and undertake both fundamental research and cutting-edge applied work. Research in MPLS tackles major societal and technological challenges – whether developing new energy solutions or improved cancer treatments, understanding climate change processes, or helping to preserve biodiversity – and is increasingly focused on key interdisciplinary issues. We collaborate closely with colleagues in Oxford across the medical sciences, social sciences and humanities and with other universities, research organisations and industrial partners across the globe in pursuit of innovative research geared to address critical and fundamental scientific questions.

MPLS is proud to be the home of some of the most creative and innovative scientific thinkers and leaders working in academe. Our senior researchers have been awarded some of the most significant scientific honours, including the most recent award of a Nobel Prize for Physics 2020 to Sir Roger Penrose. Within MPLS we are as focused on the generation as we are on those who have gone before, having a strong tradition of attracting and nurturing the very best early career researchers who regularly secure prestigious fellowships and faculty positions.

MPLS continues in its work to support diversity in its staffing, seeing that it will bring benefits to everyone. All academic departments in the Division hold Athena Swan Awards. (The Athena Swan Charter encourages and recognises commitment to advancing the careers of women in science, technology, engineering, maths and medicine employment in higher education and research.)

We have around 7,400 full and part-time students (including approximately 3,500 graduate students) and play a major role in training the next generation of leading scientists. Oxford's international reputation for excellence in teaching is reflected in its position at the top of the major league tables and subject assessments. MPLS academics educate students of high academic merit and potential from all over the world. Through a mixture of lectures, practical work and the distinctive college tutorial system, students develop their ability to solve major mathematical, scientific and engineering problems.

MPLS is dedicated to bringing the wonder and potential of science to the attention of audiences far beyond the world of academia. We have a strong commitment to supporting public engagement in science through initiatives including the Oxford Sparks portal (http://www.oxfordsparks.net/) and the Science Together programme (https://www.mpls.ox.ac.uk/public-engagement/science-together-oxford-researchers-and-communities). These are complemented by a large variety of outreach activities; these are crucial activities given so many societal and technological issues demand an understanding of the science that underpins them. We also bring the potential of our scientific efforts forward for practical and beneficial application to the real world and our desire, aided by the work of Oxford University Innovation and Oxford Science Enterprises, is to link our best scientific minds with industry and public policy makers.

For more information about the MPLS division, please visit: http://www.mpls.ox.ac.uk/

Department of Materials

The Department is one of nine within the Mathematical, Physical and Life Sciences Division of the University of Oxford, and one of world's leading materials teaching and research institutions. According to the UK's Research Excellence Framework 2021 assessment (in a Unit of Assessment joint with Engineering Science), 97% of the Overall Research was awarded the 3* (26% - internationally excellent) and the highest 4* (71% - world-leading) rating. For Research Impact and Research Environment our submission was ranked first equal within the Unit of Assessment with 90% and 100% respectively of Oxford's submission receiving the 4* rating, and overall we obtained the second highest percentage of 4* contributions within our Unit of Assessment. National league tables (Guardian, Times Good University Guide) regularly place us as the UK's top materials department.

Members of the Department, from graduate students to professors, win national and international awards for their contributions to materials science, including recognition from the Royal Society, the Royal Academy of Engineering and the American National Academy of Engineering. The Department is also active in commercialisation of its intellectual property through licensing to industry and setting up of spin-off companies.

Materials science is a diverse and exciting discipline, and new directions in the Department's research include energy storage materials and devices, and materials for quantum computing, while recently we have also significantly reinforced our leading strengths in materials characterisation, modelling and physical metallurgy.

The Department has extensive laboratory space and supporting facilities spread over two main sites. The central main site, within the Oxford Science Area, Parks Road, has seven buildings. The second site is the Oxford University Begbroke Science Park, located five miles north of Oxford. A minibus provides transport between the two sites.

The Department of Materials strives to ensure that all staff and students are given the opportunities and support they need to achieve their potential. We are committed to equality of opportunities and to advancing women and underrepresented groups' careers. We support staff returning from long-term absence and provide flexible arrangements for staff with caring responsibilities. Further information about family support can be found in the Standard Terms and Conditions. Our Equality, Diversity and Inclusion Committee contributes to many aspects of our work, see https://www.materials.ox.ac.uk/edi#/

The Department of Materials holds a Bronze Athena Swan award to recognise advancement of gender equality, representation, progression and success for all. The Department is also member of WISE (https://www.wisecampaign.org.uk/) and AFBE-UK Association for Black and Minority Ethnic Engineers (https://www.afbe.org.uk/)

As part of the department's commitment to openness, inclusivity and transparency, we strongly encourage applications from all who consider they meet the requirements of the post, and particularly from women and ethnic minorities.

TEACHING

The teaching in the Department is regularly rated as high quality. We teach two four-year undergraduate degree programmes (M.Eng level). The joint intake for this course is about 42 a year. Around 52 graduates are accepted each year to study for research degrees.

RESEARCH

The Department has an outstanding record for world class research, as underlined by the UK Government's most recent assessment of research excellence in UK universities, the 2021 REF <https://results2021.ref.ac.uk/ >, where Oxford Materials was one of the top-rated materials departments in the country. Annual external research funding in the Department is approximately £20 million, from industry, research councils, the EU and charities.

For more information on the Department of Materials, please visit: https://www.materials.ox.ac.uk

How to apply

Applications are made through our e-recruitment system and you will find all the information you need about how to apply on our Jobs website https://www.jobs.ox.ac.uk/how-to-apply.

Your application will be judged solely on the basis of how you demonstrate that you meet the selection criteria stated in the job description. We understand that careers can be non-linear and affected by all manner of external circumstance, and would be happy for candidates to include a brief contextual statement if they wish to do so.

As part of your application you will be asked to provide details of two referees and indicate whether we can contact them now.

You will be asked to upload a CV and a supporting statement. The supporting statement must explain how you meet each of the selection criteria for the post using examples of your skills and experience. This may include experience gained in employment, education, or during career breaks (such as time out to care for dependants).

Please upload all documents **as PDF files** with your name and the document type in the filename.

All applications must be received by **midday** UK time on the closing date stated in the online advertisement.

If you currently work for the University please note that:

- as part of the referencing process, we will contact your current department to confirm basic employment details including reason for leaving
- although employees may hold multiple part-time posts, they may not hold more than the equivalent of a full-time post. If you are offered this post, and accepting it would take you over the equivalent of full-time hours, you will be expected to resign from, or reduce hours in, your other posts(s) before starting work in the new post.

Information for priority candidates

A priority candidate is a University employee who is seeking redeployment because they have been advised that they are at risk of redundancy, or on grounds of ill-health/disability. Priority candidates are issued with a redeployment letter by their employing department(s).

If you are a priority candidate, please ensure that you attach your redeployment letter to your application (or email it to the contact address on the advert if the application form used for the vacancy does not allow attachments).

If you need help

Application FAQs, including technical troubleshooting advice is available at: https://staff.web.ox.ac.uk/recruitment-support-faqs

Non-technical questions about this job should be addressed to the recruiting department directly *at recruitment@materials.ox.ac.uk*

To return to the online application at any stage, please go to: www.recruit.ox.ac.uk.

Please note that you will receive an automated email from our online recruitment portal to confirm receipt of your application. **Please check your spam/junk mail** if you do not receive this email.

Important information for candidates

Data Privacy

Please note that any personal data submitted to the University as part of the job application process will be processed in accordance with the GDPR and related UK data protection legislation. For further information, please see the University's Privacy Notice for Job Applicants at: https://compliance.admin.ox.ac.uk/job-applicant-privacy-policy. The University's Policy on Data Protection is available at: https://compliance.admin.ox.ac.uk/data-protection-policy.

The University's policy on retirement

The University operates an Employer Justified Retirement Age (EJRA) for very senior research posts at **grade RSIV/D35 and clinical equivalents E62 and E82**, which with effect from 1 October 2023 will be 30 September before the 70th birthday. The justification for this is explained at: https://hr.admin.ox.ac.uk/the-ejra.

For **existing** employees on these grades, any employment beyond the retirement age is subject to approval through the procedures: https://hr.admin.ox.ac.uk/the-ejra.

There is no normal or fixed age at which staff in posts at other grades have to retire. Staff at these grades may elect to retire in accordance with the rules of the applicable pension scheme, as may be amended from time to time.

Equality of opportunity

Entry into employment with the University and progression within employment will be determined only by personal merit and the application of criteria which are related to the duties of each particular post and the relevant salary structure. In all cases, ability to perform the job will be the primary consideration. No applicant or member of staff shall be discriminated against because of age, disability, gender reassignment, marriage or civil partnership, pregnancy or maternity, race, religion or belief, sex, or sexual orientation.

Benefits of working at the University

Employee benefits

University employees enjoy 38 days' paid holiday, generous pension schemes, flexible working options, travel discounts including salary sacrifice schemes for bicycles and electric cars and other discounts. Staff can access a huge range of personal and professional development opportunities. See https://hr.admin.ox.ac.uk/staff-benefits

Employee Assistance Programme

As part of our wellbeing offering staff get free access to Health Assured, a confidential employee assistance programme, available 24/7 for 365 days a year. Find out more https://staff.admin.ox.ac.uk/health-assured-eap

University Club and sports facilities

Membership of the University Club is free for University staff. It offers social, sporting, and hospitality facilities. Staff can also use the University Sports Centre on Iffley Road at discounted rates, including a fitness centre, powerlifting room, and swimming pool. See www.club.ox.ac.uk and https://www.sport.ox.ac.uk/.

Information for staff new to Oxford

If you are relocating to Oxfordshire from overseas or elsewhere in the UK, the University's Welcome Service includes practical information about settling in the area, including advice on relocation, accommodation, and local schools. See https://welcome.ox.ac.uk/

There is also a visa loan scheme to cover the costs of UK visa applications for staff and their dependants. See https://staffimmigration.admin.ox.ac.uk/visa-loan-scheme

Family-friendly benefits

We are a family-friendly employer with one of the most generous family leave schemes in the Higher Education sector (see https://hr.web.ox.ac.uk/family-leave). Our Childcare Services team provides guidance and support on childcare provision, and offers a range of high-quality childcare options at affordable prices for staff. In addition to 5 University nurseries, we partner with a number of local providers to offer in excess of 450 full time nursery places to our staff. Eligible parents are able to pay for childcare through salary sacrifice, further reducing costs. See https://childcare.admin.ox.ac.uk/.

Supporting disability and health-related issues (inc menopause)

We are committed to supporting members of staff with disabilities or long-term health conditions, including those experiencing negative effects of menopause. Information about the University's Staff Disability Advisor, is at https://edu.admin.ox.ac.uk/disability-support. For information about how we support those going through menopause see https://hr.admin.ox.ac.uk/menopause-guidance

Staff networks

The University has a number of staff networks including for research staff, BME staff, LGBT+ staff, disabled staff network and those going through menopause. Find out more at https://edu.admin.ox.ac.uk/networks

The University of Oxford Newcomers' Club

The University of Oxford Newcomers' Club is run by volunteers that aims to assist the partners of new staff settle into Oxford, and provides them with an opportunity to meet people and make connections in the local area. See www.newcomers.ox.ac.uk.

Research staff

The Researcher Hub supports all researchers on fixed-term contracts. They aim to help you settle in comfortably, make connections, grow as a person, extend your research expertise and approach your next career step with confidence. Find out more https://www.ox.ac.uk/research/support-researchers/researcher-hub

Oxford's Research Staff Society is a collective voice for our researchers. They also organise social and professional networking activities for researchers. Find out more https://www.ox.ac.uk/research/support-researchers/connecting-other-researchers/oxford-research-staff-society