



UNIVERSITY OF LEEDS

CANDIDATE BRIEF

**Research Fellow in High Entropy Dielectric Ceramics,
Faculty of Engineering and Physical Sciences**



Salary: Grade 7 (£41,064 – £48,822 p.a.)

Reporting to: Dr Zhilun Lu

Reference: EPSPE1128

Fixed term (Until 31 May 2029 - to complete specific time limited work)

Location: Leeds main campus

We are open to discussing flexible working arrangements

Research Fellow in High Entropy Dielectric Ceramics, School of Chemical and Process Engineering.

Are you an ambitious researcher looking for your next challenge? Do you have a background in dielectric ceramic processing, characterisation, and energy storage materials? Do you want to further your career in one of the UK's leading research-intensive Universities?

Overview of the Role

This is an exciting opportunity to make a major contribution to research at the leading edge of advanced ceramic capacitor discovery, joining an EPSRC-funded project within Dr. Lu's Group. This experimentally based project seeks to develop high entropy BiFeO₃-based dielectric ceramics for next-generation multilayer ceramic capacitors (MLCCs) with significantly enhanced energy storage performance and extended operational temperature ranges. Current MLCCs are limited to operating temperatures of 150°C and insufficient energy storage density, creating critical bottlenecks for integration with wide bandgap semiconductors in power electronics. By applying a high entropy strategy, this project aims to achieve unprecedented simultaneous enhancement of energy recoverable density, efficiency, breakdown strength, and operating temperature range from -55 to 250°C. The programme will employ advanced structural characterisation tools and comprehensive functional property measurements to systematically investigate the relationship between composition, entropy level, crystal structure, and energy storage performance.

Holding a PhD (or close to completion) in Materials Science, Physics, or a closely allied discipline, you will have a strong background in dielectrics, ferroelectrics, or functional oxide materials. You will also have experience of ceramic/complex oxide fabrication, processing, and characterisation, with a strong emphasis on electrical property measurement techniques and advanced structure determination methods, including X-ray/neutron scattering and/or electron microscopy, as well as experience in the interpretation of experimental data for advanced crystal structure determination, such as Rietveld refinement or pair distribution function analysis.



Main duties and responsibilities

- Planning and leading research on the design, synthesis, and characterisation of high entropy BiFeO₃-based dielectric ceramics, using a variety of methods and techniques including solid-state processing, X-ray diffraction, electron microscopy, and property characterisation (e.g., polarisation-electric field loops, impedance spectroscopy, and temperature-dependent dielectric characterisation);
- Fabricating multilayer ceramic capacitors (MLCCs) through tape casting, screen printing, and co-firing processes;
- Analysing the relationships between composition, entropy level, crystal structure, microstructure, and energy storage performance;
- Generating and pursuing independent and original research ideas in the appropriate subject area;
- Developing research objectives and proposals and contributing to setting the direction of the research project and team including preparing proposals for funding in collaboration with colleagues;
- Evaluating methods and techniques used and results obtained by other researchers and to relate such evaluations appropriately to your own research;
- Making a significant contribution to the dissemination of research results by publication in leading peer-reviewed journals and by presentation at national and international meetings;
- Working independently and as part of a larger team of researchers, both internally and externally, to develop new research links and collaborations and engage in knowledge transfer activities where appropriate;
- Maintaining your own continuing professional development and acting as a mentor to less experienced colleagues as appropriate;
- Contributing to the training of both undergraduate and postgraduate students, including assisting with the supervision of projects in areas relevant to the project.

These duties provide a framework for the role and should not be regarded as a definitive list. Other reasonable duties may be required consistent with the grade of the post.



Qualifications and skills

Essential

- A PhD (or have submitted your thesis before taking up the role) in Materials Science or a closely allied discipline;
- A strong background in functional oxides;
- Experience of ceramic processing (powder synthesis, sintering, and densification) and MLCC fabrication (tape casting, screen printing, co-firing);
- Proficiency in complex oxide characterisation, with a strong emphasis on advanced structure determination techniques, including X-ray/neutron scattering and/or electron microscopy, and the interpretation of experimental data for crystal structure determination, such as Rietveld refinement or pair distribution function analysis;
- Good time management and planning skills, with the ability to meet tight deadlines and manage competing demands effectively without close support;
- A developing track record of peer-reviewed publications in international journals;
- Excellent communication skills both written and verbal, and the ability to communicate your research at national and international conferences;
- A proven ability to work well both independently and in a team;
- A strong commitment to your own continuous professional development.

Desirable

- Experience of pursuing external funding to support research;
- Experience with high entropy or compositionally complex ceramics;
- Familiarity with impedance spectroscopy and equivalent circuit modelling;
- Experience of materials modelling techniques, such as density functional theory or Landau-Devonshire thermodynamic theory.

How to apply

You can apply for this role online; more guidance can be found on our [How to Apply](#) information page. Applications should be submitted by **23:59** (UK time) on the advertised closing date.



Contact information

To explore the post further or for any queries you may have, please contact:

[Dr. Zhilun Lu](#), Assistant Professor of Electronic and Energy Materials

Email: Z.Lu@leeds.ac.uk

Additional information

Faculty and School Information

Further information is available on the research and teaching activities of the [Faculty of Engineering & Physical Sciences](#), and the [School of Chemical and Process Engineering](#)

Working at Leeds

We are a campus-based community and regular interaction with campus is an expectation of all roles in line with academic and service needs and the requirements of the role. We are also open to discussing flexible working arrangements. To find out more about the benefits of working at the University and what it is like to live and work in the Leeds area visit our [Working at Leeds](#) information page.

A diverse workforce

As an international research-intensive university, we welcome students and staff from all walks of life and from across the world. We foster an inclusive environment where all can flourish and prosper, and we are proud of our strong commitment to student education. Within the Faculty of Engineering and Physical Sciences we are dedicated to diversifying our community and we welcome the unique contributions that individuals can bring, and particularly encourage applications from, but not limited to Black, Asian and ethnically diverse people; people who identify as LGBT+; and people with disabilities. Candidates will always be selected based on merit and ability.

The Faculty of Engineering and Physical Sciences are proud to have been awarded the Athena SWAN [Silver](#) Award from the Equality Challenge Unit, the national body that promotes equality in the higher education sector. Our [equality and inclusion webpage](#) provides more information.



Information for disabled candidates

Information for disabled candidates, impairments or health conditions, including requesting alternative formats, can be found under the 'Accessibility' heading on our [How to Apply](#) information page or by getting in touch by emailing HR via hr@leeds.ac.uk.

Criminal Record Information

Rehabilitation of Offenders Act 1974

A criminal record check is not required for this position. However, all applicants will be required to declare if they have any 'unspent' criminal offences, including those pending.

Any offer of appointment will be in accordance with our Criminal Records policy. You can find out more about required checks and declarations in our [Criminal Records](#) information page.

Salary Requirements of the Skilled Worker Visa Route

Please note that this post may be suitable for sponsorship under the Skilled Worker visa route but first-time applicants might need to qualify for salary concessions. For more information, please visit [the Government's Skilled Worker visa page](#).

For research and academic posts, we will consider eligibility under the Global Talent visa. For more information, please visit [the Government's page, Apply for the Global Talent visa](#).

