Imperial College London

PhD post in

Advanced Characterisation of Hydrogen in Alloys

Applications are open for a PhD scholarship at Imperial College London. The project will involve the development of a new grain boundary engineering strategy for the design of hydrogen-resistant alloys. When exposed to hydrogenating environments, such as aqueous electrolytes or H_2 gas, hydrogen diffuses into metals and tends to accumulate (segregate) at grain boundaries, triggering the failure of these interfaces. In this project, the student will perform in-depth structural characterisation focusing on quantifying the co-segregation of hydrogen and other solutes at grain boundaries and evaluating its effect on their cohesive energy. This will involve the use of several characterisation techniques (e.g., SEM, EDS, EBSD, TEM, FIB, (cryo-)APT), as well as electrochemical charging/permeation, thermal desorption spectroscopy, and micro-mechanical testing.
The student will join the Materials Degradation Lab, led by Dr Livia Cupertino Malheiros. The group is part of the new Centre for Infrastructure Materials, created and equipped with £5.4M from EPSRC/UKCRIC. The student will benefit from world-class facilities in an ambitious and competitive environment. The PhD will be based in the Materials Section of the Department of Civil and Environmental Engineering, in close collaboration with the Materials Department of Imperial (Dr James Douglas and Prof Baptiste Gault) and the Mechanics of Materials Group at the University of Oxford (Prof Emilio Martinez-Paneda).

Requirements:

- A First Class Degree (or International equivalent), in materials science, engineering, physics, or other closely related disciplines
- A Master's level degree qualification, preferably with a focus on materials characterisation
- Excellent English writing and communication skills

In addition, a competitive candidate should demonstrate the following desirable (non-essential) qualifications:

- Experience in electron microscopy
- Related research experience that has led to high-quality outputs (e.g., publications)

Funding and Eligibility: The studentship will provide funding for 3.5 years including tuition fees and a tax-free stipend at the standard UKRI London rate. Full funding is available to Home (UK) students. The funding can also be used to partly support an international student.

How to apply: by sending the following documents to Dr Livia Cupertino Malheiros (l.cupertino-malheiros@imperial.ac.uk)

- CV, including average grades and research experience (if any)
- Cover letter, explaining their motivation and suitability
- Contact details of two academic referees

Application via the Imperial College Registry is not necessary at this stage.
Review of applications will begin immediately and continue until the position is filled.

For further details, informal discussions and information about the project please contact Dr Livia Cupertino Malheiros at l.cupertino-malheiros@imperial.ac.uk