Imperial College London, Department of Materials

Project title: PhD Studentship in steel oxidation and wear (in collaboration with Rolls-Royce plc and the EPSRC Nuclear Energy Futures CDT)

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Rolls-Royce POC: Dr David Stewart

Applications are invited for a research studentship in the field of oxidation of valve and bearing surfaces for nuclear power plant, leading to the award of a PhD degree. The post is supported by a bursary and fees and is sponsored by EPSRC and Rolls-Royce.

Project Summary: Cobalt-based alloys offer excellent properties in terms of wear and corrosion resistance. In nuclear applications, however, these cobalt-based alloys can cause high background radiation dose levels from activation of cobalt-containing corrosion by-products, which can therefore affect component lifing. One such application of these alloys is wear surfaces in pressurised water reactors where due to the nature of the water-based environment and stringent chemistry controls, typical corrosion resistant palliatives cannot be employed to minimise wear and prolong component life. This study aims to simulate service conditions experimentally using wear/galling equipment, then characterise the corrosion and oxidation by-products using a variety of advanced microscopy and tomography techniques. This can be used to understand and quantify the mechanisms of degradation through thermodynamic models and, hence, to understand valve/bearing life and cobalt-based material release and potential alternative solutions.

This PhD project is sponsored by the EPSRC and the Rolls-Royce Nuclear Energy Futures Centre for Doctoral Training (CDT) based in the Materials and Mechanical Engineering Departments, Imperial College London.

We are looking for an enthusiastic and self-motivated person who meets the academic requirements for enrolment for the PhD degree at Imperial College London. You need to have a background in Chemical or Mechanical Engineering, Materials, Physics, Computing or a related field, and an enquiring and rigorous approach to research together with a strong intellect and disciplined work habits. Training will be given in the relevant investigative techniques. You will become a skilled communicator, comfortable in an international situation. Good team-working, observational and communication skills are essential. The project will involve close collaboration with Rolls-Royce and you will be expected to visit and communicate with various Rolls-Royce Technology Centres.

Committed to equality and valuing diversity. We are also an Athena Bronze SWAN Award winner, a Stonewall Diversity Champion and a Two Ticks Employer