PhD Studentship

Professor Barbara Shollock (WMG) & Professor Pat Unwin (Chemistry)

PhD project: Correlative Electrochemical Microscopy of Engineering Alloys
Supervisor: Barbara Shollock (WMG) and Pat Unwin (Chemistry)
Deadline: 30th July 2017

Project description:
Controlling the corrosion of metallic alloys is a critical issue in a range of sectors and applications – implants in medicine, materials in construction and in vehicles – in terms of aesthetics, performance and structural integrity. Corrosion is estimated to cost developed nations about 3% of GDP. Engineering alloys such as alloy steels, stainless steels, and aluminium and titanium alloys can fail by process called stress corrosion cracking which involves simultaneous interaction of metallurgical, environmental and mechanical factors. These processes are highly localized and much more information is needed on the electrochemical and chemical processes involved and the relationship to microscopic structure. This PhD will address this aim and set a new course for studying corrosion through the use of innovative methods.

We will use a range of complementary multi-length scale (nano to macro) experimental techniques, including state of the art microscopy and electrochemical methods underpinned by mass transport and reaction modelling. Innovative electrochemical imaging approaches pioneered at Warwick, and gaining global attention (see: http://pubs.acs.org/doi/abs/10.1021/acs.langmuir.6b01932) will be combined with advanced microstructural characterisation techniques (SEM, TEM, EBSD).

This multidisciplinary PhD will provide a unique and exciting opportunity to carry out high impact research and will provide an opportunity to learn a wide range of important scientific and other skills. The project spans between 2 leading groups at the University of Warwick at the Chemistry-Engineering interface and is expected to lead to publications in top journals and give opportunities to present the work at international conferences.

Requirements:
Eligible candidates must be UK Citizens and hold a Bachelor’s or Master’s degree at first class or 2.1 in Chemistry, Physics, Engineering or Maths.

How to apply:
Please direct informal enquiries and requests for further information to B.Shollock@warwick.ac.uk and/or P.R.Unwin@warwick.ac.uk

Details on the formal application procedure can be found at http://www.go.warwick.ac.uk/pgapply