

# Dr. Andy Mount Reader in Physical Chemistry

e-mail: [A.Mount@ed.ac.uk](mailto:A.Mount@ed.ac.uk)

tel: 0131 650 4747

Research Interests: electrochemistry, modified electrodes, biosensors, microelectrode arrays, electrochemical machining, electrochemical synthesis, molten salts



One area of group interest is in the production and characterization of selective redox-active or other high added value layers on metal electrode surfaces. Some of these films are designed for the interconversion of electronic and biological signals, enabling the integration of semiconductor and microarray technology with biology. For example, as part of substantial multidisciplinary projects, we are developing through DTI Beacon (<http://www.gti.ed.ac.uk/beacon.html>) the use of DNA molecules as molecular switches, controlled by electronic and biochemical signals, for applications in genomic science and technology, a novel ITI Techmedia biosensing platform for disease diagnosis and therapeutic monitoring ([http://www.gti.ed.ac.uk/biochip\\_medicine.html](http://www.gti.ed.ac.uk/biochip_medicine.html)) and novel Biomimetic systems (<http://www.BiomimeticSystems.org>) through EU Marie Curie funding. We are interested in the electrochemical synthesis and fundamental properties of novel organic luminescent conducting films and in the novel low temperature synthesis of metal nitride surface films (commercially applicable as diffusion barriers in electronics and optoelectronics, and as antiwear, reflective and decorative coatings) and we study the electrode position of high value-added metal thin films on electrodes and microelectrodes.



In industrially sponsored programmes, we have developed a novel planar system for the in-situ parameterization of the electrochemical machining (ECM) of industrially important alloys; this is a contactless process for the machining and shaping of hard metals (e.g. turbine blades), by the controlled electrochemical oxidation and dissolution of a metal alloy (the workpiece) by a shaped counter electrode (the tool), removing products in the interelectrode gap in the flowing electrolyte solution. Its use is hindered by the lack of parameterization, which has made tool shape design a costly, iterative process. We also study the electrochemical characteristics of molten salt systems for the selected extraction of metals.

## RECENT SELECTED PUBLICATIONS

1. P Jennings, A C Jones, A R Mount, In Situ Spectroelectrochemical Studies of the Fluorescence of 5-substituted Indole Trimer Films, *Phys. Chem. Chem. Phys.*, 2, **2000**, 1241.
2. Low Temperature Electrosynthesis of Titanium Nitride, L E Griffiths, M R Lee, A R Mount, H Kondoh, T Ohta, C R Pulham, *JCS Chem. Comm.*, **2001**, 579.
3. Electrodeposition of Pt metal on Ti Thin Films, S A G Evans, J G Terry, A J Walton, L M Keane, C J Campbell, P Ghazal, J S Beattie, T-J Su, J Crain, A R Mount, *Electrochem. Comm.*, 7, **2005**, 125.
4. E E Ferapontova, J G Terry, C P Mountford, A H Buck, P Dickinson, C J Campbell, J S Beattie, A J Walton, P Ghazal, J Crain, and A R Mount, Electrochemical deposition of Zn on TiN microelectrode arrays for microanodes, *Electrochem. Comm.*, 9, **2007**, 303.
5. The stability and characteristics of a DNA Holliday junction switch, A.R. Mount, C.P. Mountford, S.A.G. Evans, T.-J. Su, A.H. Buck, P. Dickinson, C.J. Campbell, L.M. Keane, J.G. Terry, J.S. Beattie, A.J. Walton, P. Ghazal, J. Crain, 124(3), **2006**, 214.
6. A.R. Mount, R N Muir, The Dissolution Characteristics of Iron and Stainless Steels in Chloride under Electrochemical Machining Conditions, *J. Electrochem. Soc.*, 154(3), **2007**, 1.