

# The Southampton Electrochemistry SummerSchool

## *Instrumental Methods in Electrochemistry*

**5<sup>th</sup> – 10<sup>th</sup> July 2009**

A one-week residential course presented regularly since 1969 by the Southampton Electrochemistry Group.

Southampton Electrochemistry SummerSchool



[www.soton.ac.uk/~gd/summerschool.html](http://www.soton.ac.uk/~gd/summerschool.html)

The course comprises a combination of lectures and laboratory work. The objective is to teach the application of modern electrochemical techniques to problems in *Chemistry, Biology, Sensing, Materials Science, Energy Generation and Storage and Industrial Processing*.

The lectures introduce fundamental electrochemistry and electrochemical techniques. Examples of the use of each technique to obtain kinetic and / or thermodynamic parameters are given and experimental difficulties, modern methods of data handling / analysis as well as the selection of appropriate techniques for particular investigations, are discussed. The practical sessions allow each participant to choose and carry out five selected experiments to reinforce the lectures and many opportunities for informal discussion. A text book together with copies of lecture material as hard copy and a CD Rom are provided.

Topics covered in the course include:

- Electron transfer
- Mass transport in liquids and solids
- Current-time and current-potential characteristics
- Chronoamperometry and Cyclic voltammetry
- Rotating disc electrodes, Ultramicroelectrodes
- AC impedance, Spectroelectrochemistry
- Solid state electrochemistry
- Instrumentation
- Experimental good practice and limitations

# Programme

*Sun.:* Registration and welcome reception

*Mon.:* Lectures, lunch, practicals, trip to Winchester

*Tues.:* Lectures, lunch, practicals, free evening

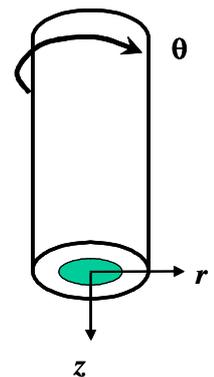
*Wed.:* Lectures, lunch, practicals, free evening

*Thu.:* Lectures, lunch, practicals, Course Dinner

*Fri.:* Practical, lunch, end of course

## Lectures

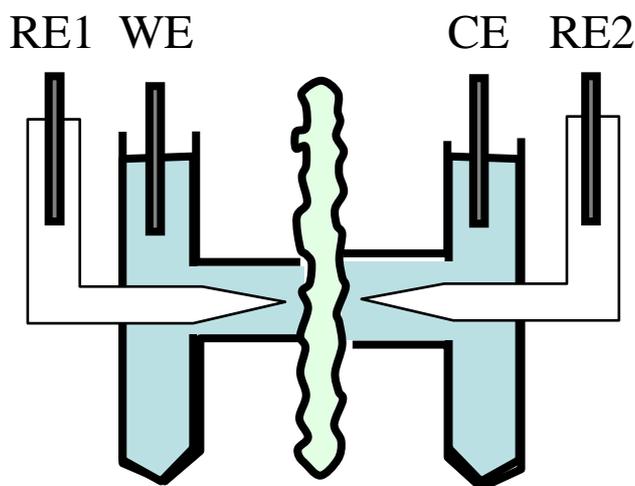
1. Introduction
2. Electron transfer
3. Factors affecting experimental response
4. Time in electrochemistry
5. The double layer
6. Design of experiments
7. Electrochemistry in solids
8. Steady state voltammetry at microelectrodes and rotating disc electrodes
- 9.-12. Cyclic voltammetry and its applications
- 13.-16. Impedance and its applications



# Practicals

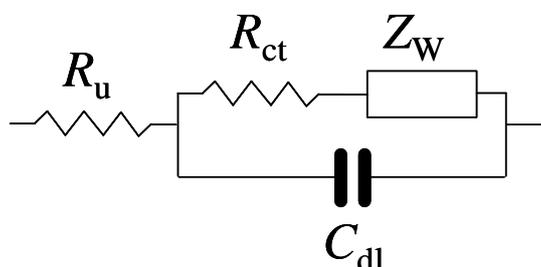
Hands on practicals based on state of the art PC driven instrumentation from leading manufacturers. Each participant will do 5 experiments with 12 available. A typical list of experiments:

1. Cyclic Voltammetry (I) - Surface Reactions
2. Cyclic Voltammetry (II) - Solution Reactions:
3. Digital simulations of electrochemical processes
4. Fuel cells characterisation
5. Rotating Disc Electrode
6. Rotating Ring Disc Electrode
7. Microelectrodes
8. A.C. Impedance Spectroscopy
9. Characterisation of Electrochemical Materials
10. Factors Determining Experimental Response
11. Spectroelectrochemistry
12. Electrodeposition of metals and Scanning Electron Microscopy



# SummerSchool Staff

Prof Phil Bartlett  
Dr Peter Birkin  
Mr Alistair Clark  
Dr Guy Denuault  
Prof John Owen  
Prof Derek Pletcher  
Dr Andrea Russell  
Prof Frank Walsh



## Course Fees

£1000, payment before 1<sup>st</sup> May 2009

£1200, payment after 1<sup>st</sup> May 2009

The fees include lunches, refreshments, transport (including trip to Winchester), Course Dinner, electrochemistry textbook, lecture notes, laboratory scripts and CD Rom.

The SummerSchool hotels are the Novotel Southampton (£70 - £110 / room / night + breakfast), the Hotel Ibis Southampton (£70 - £80 / room / night + breakfast) and the Etap Hotel Southampton (£35 / room / night + breakfast). A coach will transport delegates between these hotels and the university and to the social events.

*Accommodation is not included in the course fees. Delegates have to make their own reservation, [www.novotel.com](http://www.novotel.com), [www.ibishotel.com](http://www.ibishotel.com), [www.etaphotel.com](http://www.etaphotel.com)*

# Bookings & Enquiries

Contact

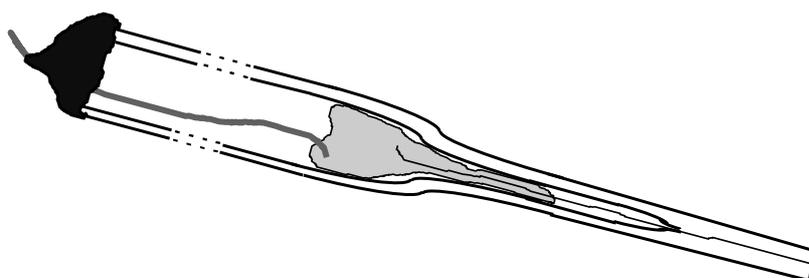
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For additional details visit:

[www.soton.ac.uk/~gd/summerschool.html](http://www.soton.ac.uk/~gd/summerschool.html)