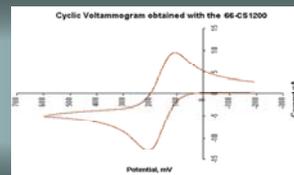


Experiments in Analytical Electrochemistry



I. Commentary –

Quote by the author: *“Electrochemistry is important in the field of drug discovery, life science and nanotechnology research, and in analytical applications. So teaching and learning about electrochemistry should be encouraged. However, a course in electrochemistry is time consuming and requires instrumentation and expertise in developing a curriculum. With this manual and the companion “concepts” part in the courseware online section of JASDL, it should be easier to do so.”* - Dr. Theodore Kuwana

Welcome to this laboratory manual that consists of seven individual experiments to demonstrate the principles and applications of analytical electrochemistry. Each experiment is self-contained with detailed instruction on set-up and procedure. The set of experiments can be used for an entire semester or individual ones selected to fit the instructor’s wishes.

The experiments deal with voltammetric methods – that is, the simultaneous measurement of the cell current and potential. Historically, the early development of voltammetry was with a dropping mercury electrode by Jaroslav Heyrovsky in the 1920’s at Charles University, Prague, as recognized by the subsequent awarding of the Nobel Prize in 1959. Because Hg has a high overpotential to the generation of hydrogen, but is easily oxidized at relatively low potentials, polarography dealt mainly with reductions such as inorganic metal ions, metal complexes and organics. The term “polarography” now is used in reference to voltammetry at a dropping Hg electrode.

Acknowledgement

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The experimental data for figures in this manual were obtained with the Cypress Systems’ Model Omni-101 microprocessor or CS-1200 computerized potentiostat and their electrodes. Product information is available at www.esainc.com/products/type/non-hplc and www.esainc.com/products/type/non-hplc/electrodes_general.

II. Disclaimers –

1. Publication of this manual by ASDL/asdlib does not constitute, nor should be construed to be, an endorsement of any and all products manufactured and/or sold by Cypress Systems/ESA Bioscience, Inc., 22 Alpha Rd., Chelmsford, MA 01824-4171.
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3. Please be advised that the number of data being signal averaged, the output data rate, and the way current is integrated, depend on the type of potentiostat and its software, if you are using a computerized operating system with built-in math functions.