Colorado State University
Department of Chemistry

CHEM 431
Instrumental Analysis Laboratory

Notes for
Electrochemistry - Voltammetry

The following is a set of short notes to outline the experiment in question and to provide helpful guidance to those executing the experiment.

1. **Voltammetry is the method of following reduction-oxidation reactions through the imposition of an electrical potential (a voltage) across an electrochemical cell and measuring the current (an electron flow) passing through the cell.**
2. **Study up on voltammetry and cyclic voltammetry from references. At each major step in the experimental work collect a voltammagram for inclusion in a laboratory report.**
3. **Configure the potentiostat using a dummy resistor set to simulate an electrochemical cell. Learn how to collect a voltammagram (including the exportation of experimental data and import into Igor). Use +1.0 and -1.0 V for the endpoints and 200 mV s^{-1} for the sweep rate.**
4. **Prepare your own silver-silver chloride reference electrode with an agar-salt (KCl) bridge. Use a Luggin-style construction.**
5. **Configure an electrochemical cell with the platinum working, platinum counter and the reference electrodes using approximately (but known exactly) 10 mM $FeCl_3$ in approximately 1 M H_2SO_4 as the electrolyte. Learn how to select appropriate potentials for the endpoints.**
6. **See if you can successfully and convincingly observe voltammagrams using lower concentrations of $FeCl_3$. It might be necessary to sparge the cell with nitrogen to reduce the background reactions.**
7. **Collect a comprehensive set of experimental data in support of the Nernst equation using voltammetry measurements on the quinone-hydroquinone redox couple in buffered aqueous solution according to reference J. Chem. Ed. 1997, 74 1195-1197. Use your platinum working electrode instead of the gold one described in the reference (adjust the endpoint potentials accordingly). Be clever in preparing the necessary solutions.**