

LAB WRITE UP

The lab write up should include the following information

A. Error Analysis

Discuss in detail reasons both within and outside of your control that could explain the difference between your calculated acetaminophen concentration and the label value. Additionally, explain any other significant sources of error in cyclic voltammetry experiments in general.

B. Report Questions and Points for Discussion

1. Write and discuss in detail the electrode reaction that is occurring for each peak of the cyclic voltammograms obtained for each of the three supporting electrolytes. Also explain differences, if any, in the cyclic voltammograms with increase in scan rate. What insights do these changes offer into the mechanism of APAP oxidation?
2. What effect would lowering the temperature have on the cyclic voltammograms of APAP in pH 2.2?
3. Explain why faster scan rates are necessary to study mechanisms involving faster chemical reactions. What problems can you anticipate encountering for very fast scan rate (>100 V/s)?
4. An electrode mechanism in which the electrogenerated species reacts chemically is termed an EC mechanism and can be described by the following equations:

Electrode reaction: $O + ne$ (rev. arrows) R

Chemical reaction: R (arrow w/ k) product

Draw cyclic voltammograms for the following cases. (Assume the electrode reaction to be reversible.)

- a. The rate constant k is zero.
- b. The rate constant k is so large that the chemical reaction is essentially instantaneous relative to the scan rate.
- c. k has an intermediate value between those in a and b.