

Instructions and Guiding Questions for Formal Report for Experiment 2 – Iodine Clock Reaction

Abstract

- Describe in 2-3 sentences the type of experiment that was performed, what was measured, and why.
 - What are the final, most important results/findings of the experiment? Identify them and state them in the abstract.

Introduction

- Provide the reader with a discussion of why kinetics is studied, the underlying theory of this experiment, what is being studied in this experiment, and what is expected to be observed.
 - What is chemical kinetics and why is it studied?
 - What particular concepts and theories of chemical kinetics are being investigated in this experiment and how does it explain at the molecular level the macroscopic observations of chemical reaction rates? (Refer to your Experiment 2 handout and your text.)
 - What are the chemical equations for the reactions that occur?
 - What is the purpose of the clock reaction?
 - What are the mathematical equations relevant to theory underlying this experiment?
 - Based on how this experiment is performed, what is expected to be observed? Why?

Experimental

- Provide the reader with a description of the important aspects of the experimental procedure.
 - What different mixtures of reactants were used for each trial?
 - What were the actual temperatures of the reaction mixtures?
 - Were any trials repeated? Why?
 - Were there any deviations from the procedure described in the handout for Experiment 2? Why?

Results

- Provide the reader with a summary description of the observed data and overall results of this experiment. Include tables and graphs in this section. Report all numerical results to the proper number of significant digits. Always start with an introductory paragraph. Never start with a table or graph!
 - What are the most relevant data tables that need to be provided?
 - What graph do you need to provide, and what information is obtained from that graph?
 - What trends and relationships between experimental data are you able to observe? Describe them in your narrative.

- Are there any anomalies or inconsistencies? If so, describe them.

Conclusion

- Provide the reader with a thorough explanation(s) of your results, based on the underlying theory for this experiment. The basis of your discussion is what you have learned about chemical kinetics, the rate law, and collision/Arrhenius theory.
 - Are the results observed in all parts of the experiment consistent with the underlying concepts and theories being studied and the experimental procedures you performed? If so why?
 - What molecular-level explanations can you provide that explain the macroscopic observations of reaction rate? (Hint: remember the role of collisions in chemical reactions, and what effects concentration and temperature have on collisions.)
 - Are there anomalies or inconsistencies between your results and the predictions of collision/Arrhenius theory? If so, explain why.
 - Did addition of catalyst give the expected result? Within the context of collision theory, what does a catalyst do?

Sample Calculations

- Provide neatly handwritten (not typed!) sample calculations on separate pages for the following:
 - The concentrations of reactants after mixing, determination of the orders for each reactant
 - The reaction rate
 - The determination of the rate constant k and the average value for k
 - The determination of the activation energy, E_a