

Chemical Kinetics

Name: _____ Date: _____

Partner: _____

Use *complete sentences*, use the proper number of significant figures, and include units.

Introduction: (2-sentence maximum; state the scientific purpose of the experiment. Describe the method you will use, in a general sense):

Procedure: (Give one-sentence descriptions of the two methods that you used to determine the order of the reaction with respect to crystal violet and hydroxide. Reference the lab write-up on the CH145 On-line Laboratory Manual and list any changes. Give the cell material and path length and the manufacturer and model of the spectrophotometer.)

Results: (Provide the information requested in the Laboratory Report section of the lab write-up.)

Discussion: (a). Purpose accomplished:

(b). Write the reaction that you are studying.

(c). Give the final results for the order with respect to hydroxide. Discuss if the order is sufficiently close to an integer value or a simple rational fraction (e.g. $\frac{1}{2}$, $\frac{3}{4}$, etc.).

(d). Give the results for the order of the reaction with respect to crystal violet. Describe how you reached your conclusion.

(e). Give the results for the average rate constant from the five initial rate studies and the rate constant from the time course study.

- (f). Consider the effect of random and systematic errors on the difference in Part e.
- (i). Name the predominant random error in the measurements and estimate the effect on the determination of the order with respect to hydroxide and if the result is sufficiently close to an integer. Determine if the difference between the average rate constant from the initial rate studies and the time course measurement are explained by random error.

 - (ii). Suggest a source of systematic error. Remember that student mistakes are neither random nor systematic errors; student mistakes are just student mistakes. What effect does the source of systematic error have on the final results? (For example, does the systematic error cause curvature in the plots or increase or decrease the value determined for the reaction orders or the rate constants?)
- (g). To summarize the experiment answer the following questions:
- (i). In the kinetics studies, you always brought the total volume in the cuvette to 3.00 mL. Why is constant volume necessary?

 - (ii). What advantages or disadvantages do initial rate studies have in comparison to time course studies in determining the order of the reaction with respect to a given reactant?

Literature Cited: Give all literature cited, numbered according to the references in the body of your report. (You may not have any literature cited for this report other than a reference to the lab write-up and the On-line URL. Don't forget the last accessed date. See experiment 1 for the format of the reference to the on-line lab manual.)

Attach the plot used for the initial rate study. Attach the two plots used to determine the order with respect to crystal violet.

Checklist:

- Use complete sentences and provide the proper number of significant figures and units.
- All Figures and Tables must have captions.
- Refer by number to each figure and table in the body of the text or your report.
- Acknowledge any data that were not taken by you and your partner (if you had a partner).
- Captions start with Figure # or Table # and then a concise description of the contents.
- You can write the captions by hand in black pen on attached sheets.
- Answer all the questions in the Discussion section of the write-up.
- Remove all the italicized prompts in your final report. The report should then read smoothly.