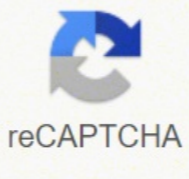




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CHEM 1002

Laboratory 3: Chemical Kinetics: Determining the order of a reaction

NAME: _____
DATE: 10/20/2017
LAB SECTION: 04

The Objective

A. Introduction/Purpose of Experiment

Introduction: This lab will determine the order of a reaction and the rate constant for the reaction between hydrogen peroxide and potassium iodide. The reaction is as follows:

$$2\text{H}_2\text{O}_2(aq) \rightarrow 2\text{H}_2\text{O}(l) + \text{O}_2(g)$$

The reaction is catalyzed by the iodide ion. The rate of reaction will be determined by measuring the volume of oxygen gas produced over time. The rate of reaction will be determined by measuring the volume of oxygen gas produced over time. The rate of reaction will be determined by measuring the volume of oxygen gas produced over time.

Chemistry 142 Lab Reports
Spring 2009

Martin Larer

Chemistry 142 Lab Reports

Lab Notebook Format

Title and date.

Objective: What is being investigated?

Data & Observations. This section will be written as you perform the experiment; the data you collect and observations that you make are recorded here. Perhaps the easiest way to collect your data and observations is to paraphrase the procedure as you go through the steps and then enter your observation and data for that step. Simply enter a one- or two-line statement to describe the operation and immediately afterwards, record your data. You do not need to write complete, grammatically correct sentences in this section as it is understood that you will be concentrating on the experiment. Write all observations and data for the experiment in this section. This section is your rough draft for the report. As you record your data and observations, this section may become messy and unorganized which is to be expected. You may want to add a summary of your data in the form of tables, charts or lists to facilitate writing the report rather than trying to "hunt" through disjointed recordings.

Report

Title Page

Include experiment name, date, your name, instructor name, and section number.

Introduction

The Introduction contains three major pieces of information, (1) the objective of the experiment, (2) the theory behind the experiment and (3) the method to be used. This section will not always be lengthy but it should be sufficient such that the reader can understand the purpose of the experiment simply by reading this section.

Objective. The Objective of the experiment should be clearly stated at the beginning of the Introduction. The objective (or goal) can usually be stated in one sentence or at most, a short paragraph. The objective is not always conveniently given at the beginning of each experiment in the lab manual. Often, the experiments in the manual begin with some background information which helps to elucidate the theoretical aspects of the experiment and it is left to the student to deduce the purpose of the experiment. Occasionally, the goal is stated in the body of this background text. Therefore, it is crucial that the student read each experiment thoroughly before coming to lab so that an appropriate (and accurate) objective can be formulated in your Introduction. This will also prepare the student for the experiment itself.

Theory. Next, succinctly explain the theoretical basis of the experiment and describe the method that will be used to achieve the objective. In some experiments, there is very little "theory" that can be discussed, for example, learning about a new lab technique or getting familiar with a particular piece of lab equipment. In these cases, simply describe how the

Chem 1002

10/20/17

Lab Report: Chemical Kinetics

I. Introduction

The goal of this experiment is to determine the chemical rate law for the oxidation of iodide ions by persulfate ions: $2\text{I}^-(aq) + \text{S}_2\text{O}_8^{2-}(aq) \rightarrow \text{I}_2(aq) + 2\text{SO}_4^{2-}(aq)$

To determine this chemical rate law, you first have to use experimental techniques and in this case, the initial rates method is used. This is composed of two reactions, the first being the reaction of iodide with an iodate ion, as shown in table 1, and the second reaction is the oxidation of iodide ions by persulfate as shown in table 2. Several runs are done of these reactions, data being recorded each time. By varying the initial iodide ion concentration in run 1 and then varying the concentration of persulfate ion, the experiment is set up so that the rate law can be determined. The general rate law for the reaction between the iodide ions and persulfate ions is $\text{rate} = k[\text{I}^-]^m[\text{S}_2\text{O}_8^{2-}]^n$, where k is the rate constant, m is the order of the reaction with respect to iodide ion, and n is the order of the reaction with respect to persulfate ion. By using the initial rates method in the first part of the experiment and varying the concentration of I^- .

II. Preliminary Questions

1.

Run	$[\text{I}^-]$	$[\text{S}_2\text{O}_8^{2-}]$	$[\text{I}_2]$
1	0.1 M	0.1 M	0.01 M
2	0.1 M	0.1 M	0.02 M
3	0.05 M	0.1 M	0.01 M
4	0.05 M	0.2 M	0.02 M
5	0.1 M	0.1 M	0.01 M
6	0.1 M	0.2 M	0.02 M
7	0.2 M	0.05 M	0.01 M

2. $[\text{I}_2]_{\text{rate}} = 2k[\text{I}^-]^m[\text{S}_2\text{O}_8^{2-}]^n$ because the two reactions (both listed in introduction) that both share iodide ions in each other combine a coefficient of 2 in front of the I_2 ion. Since the entire reaction takes place with each iodide concentration of 0.05M , the rate law can be assumed to be equal to $[\text{I}_2]_{\text{rate}}/[\text{I}^-]^m$, where the concentrations are actually the initial concentrations of each reactant. This is why $[\text{I}_2]_{\text{rate}} = 2k[\text{I}_2]_{\text{rate}}$, recognizing that $[\text{I}_2]_{\text{rate}}$ has a coefficient of 2 and the rate law has a negative sign in it.

3. I^- is a specific catalyst in any reaction, speeds up the reaction by lowering the activation energy (ΔG^\ddagger) for the reaction. The catalyst for reactions is used less energy to make an equilibrium (get over the "hump" or a reaction coordinate diagram) it makes the rate change the chemical thermodynamics for the reaction and I^- is not changed.

Abstract
Introduction
Materials
Methods
Results
Discussion
Conclusion

Example of chemistry abstract lab report. What is chemical abstract.

The amounts of Propanona, distilled water and HCl followed: 1st 2â^o solution 3rd solution 4th 4â^o solution 5â^o solution CH₃COCH₃ (cm³) (â ± 1.5 cm³) 100 90 70 70 60 H₂O (cm³) (â ± 1.5 cm³) 0 10 20 30 40 HCl (cm³) (â ± 1.5 cm³) 50 50 50 50 50 Therefore, propanone concentrations were 2m, 1.8m, 1.6m, 1.4m and 1.2m. For this laboratory, we use a virtual laboratory, to determine how these factors affect the reaction speed. log (i â, ~) and log (r) v. He organized to be equal to concentration (4). This laboratory was ostile to determine how reaction speed could be affected by certain situations. Introduction reaction, or the reaction speed is the speed at which a chemical reaction takes place, which is proportional to the concentration of a product per unit of time. Some of these factors are the concentration because with more moles more physical states of collision, which can mix reagents or increase the surface users. (1) the "k" represents the constant rate, "[I]" means the concentration, and the "m" does not represent the order of the reaction with respect to the concentration. The speed constant can be calculated by dividing the initial velocity of the reaction by the concentrations of CH₃COCH₃ and H⁺. Half of the solutions were placed in the refrigerator to cool the solutions and others were at room temperature during the night. In this experiment, the K units are molâ^l s⁻¹ â^l mol⁻¹ s⁻¹ 1 dm³ ... showing more content ... to guarantee the constant rate between HCl and Propanona, solutions of Propanona and HCl were prepared following the following steps : 100 cm³ of 2m propanona in 250 cm³, the medicine cylinder (â ± 1.5 cm³) 50 cm³ of 2 m HCl was spoke at the top of the propanone (â ± 1.5 cm³), the mixture is poured between two bottles of 250 ml closed with corks, the process was repeated for 5 times Every time the propanone was diluted by 10%. The speed constant is independent of the concentrations of But it can depend on environmental factors such as temperatures. You can download the document by clicking on the upstream. One way in which the reaction that occurs is to explain as follows: in the speed equation K is constant speed. During this laboratory, we recorded how the reaction speed, the differences of time between the factors, the effect of the activation energy changed. He meets the absorbance equation (2). In addition, this, the chemical cynical one can be used in many different areas: for example, in pharmacology to determine how much the medication is dissolved or in the food industry to understand the food decomposition. 2. After finding absorbance, the law of beer is used to find concentration. Also the temperature can increase the cynical energy of the culs, and the catalysis can reduce the energy activation energy. There are multiple things that can affect the reaction of speed, so in this laboratory, we are testing them to see what happens with the reaction rate after these factors get into play. (4) When finding the concentration of blue and bleaching, it will help to reach the proposal of the laboratory, which is to determine the constant speed of the reaction with the blue dye and the bleach, also known as NaOCl. Results and discussion The naocl concentration was 1,343 m until the first order and the blue concentration was 0.53 m also to the first order. Chemical cynical (reaction speed) Summary: The point of this virtual laboratory is to find what factors affect the reaction rate. This research focuses on the cynic of acetone iodination and the reaction used in this experiment is following: CH₃COCH₃ (aq) + I₂ (aq) â^l â^l â^l CH₃COCH₂I (aq) + I⁻ (aq) This reaction is adequate because it is paid To make multiple races, but ... it shows more content ... the reaction is of the first order with respect to the propanone and the one, and the zero order with respect to the iodine. INTRODUCTION "The chemical cynical is the study of determining the of a reaction under certain conditions. -The, the â^ordenes are based on the initial concentrations of the reagents, and the law of speed is determined experimentally, since the speed will be measured during the experiment. B) and, where a and b are the reagents, x and y are the individual? One of the concentrations must be constant. If one determined the value of X, the reactor B concentration will need to keep rate. These values are then entered in the previous equation and divided by sâ.] 1/[a] 2) x, and from this, and can be determined taking the registration of both sides of the equation, and then the simple division. A constant. After x and y have determined, K, K can be calculated. Simply written, it is k = r/[a] x [b] and y). The virtual laboratory we use was extremely â ostil, since it was a visual help to see The cuisas were affected by these different factors. Materials: â^l â^l â^l A computer that has Internet access expands 4: Chemical Cinics Introduction The chemical cynical is the study of the reaction speed. The main reactions were made in vessels, four at the same time. References 1. Lecine, Ira N. The speed of a reaction depends on the concentration of reagents, a greater concentration causes a higher reaction rate and the temperature of the reaction, the higher the temperature, greater will be the speed. Log (H₂O₂) respectively. Of these data, it can be concluded that the reaction has a general order of 2 and that the I and H₂O₂ have individual entredenes of 1. However, when the iodine concentration is changed, the rate is not affected. (3) "A" means absorbance, "" "B" is the wavelength that in this laboratory is 630 nm, and the" C "is the concentration. To calculate the activation energy, the speed constant must be calculated at different temperatures. In this particular experiment, the speed constant is calculated in the following temperatures: 9 ° C, 22 ° C, 29 ° C, 37 ° C, 45 ° C. Fifth Edition. Then a series of mini reactions were made in test tubes. To a test tube, 5 ml of KI were added to 5 drops of H₂O₂; This solution was then distributed to 3 additional test tubes. The first of the three test tubes was used as a control, to the second test tube, 3-4 drops of starch and to the third, 1-2 ml of Na₂S₂O₃ were added, then 3 drops of starch were added. This property can be used to find K with different concentrations and find the average to ensure that the value of K at a specific temperature is reliable. Cinnamic is an issue, which investigates the reaction speed. In this laboratory, equation is expressed as equation (1). To find the beer law of But before finding concentration, absorbance must be found first. It is worth a shame Because we give us knowledge about how reactions and reaction mechanisms occur. Madonna University. MEDICINE OF THE PREVIOUS VIEW OF LOAD, THE PRESERVE VIEW IS NOT AVAILABLE. Subsequently, for temperatures, 29 ° C, 37 ° C and 45 ° C, the solutions were put in water bath to maintain the constant temperature. NGEYI, Stanley-Pierre, Ph.D. (2014) Femic chemical notes. Livonia, my (2) "%â, ~" means transmittance and transmission is obtained from the spectronic 20. By: Colleen tuttle abstract "of the reaction, so as the order of each of the reagents. In the laboratory, We tried to see how reaction speed is affected by these factors. Physical chemical. After all individual rate constants have been determined and averaged, the final rate law can be written.2 The amounts of x, And and k only can be obtained through experimental data because they are empirical number. Therefore, if these same reactions were made under different conditions of those originally carried out, the values can be different. Temperature, concentrations of the reagents, reagents, impurities and the presence of catalysts can affect the values of x, and k.1 experimental procedure "numerous steps were completed several times during this experiment to obtain all the necessary data to compile l A Final Rate Law. Before the experiments could begin, the solutions should be done.) A solution was performed by weighing 20.75 g of ki in a beaker, dissolving that in distilled water, adding that to a volume flask of 500 ml and then it was filled to the filling line in the neck with distilled water, assure Being washing the origin l â jla la La Control the Ki well, to obtain the entire compound in The Na₂S₂O₃ solution was performed in the same way, using 7.906 g of Na₂S₂O₃ dissolved in a beaker and then added to a separate volume flask. 1-2 g of starch dissolved in 500 ml of distilled water and then heated. For the first set of reactions, the volume of KI was changed, while in the second set of reactions, the volume of H₂O₂ was changed. See the table below to obtain exact values. All reagents were placed in the beaker at the same time, except the H₂O₂, which added the same end, to measure the speed of the reaction. Once the H₂O₂ was added, the solution stirred and timed until the color change appeared for the first time. Eight reactions. Conclusion "In this experiment, numerous small reactions were carried out to demonstrate the chemical cynical properties of the speed laws. Change. And the constant rate to be evaluated from the graph of the log (r) v. 2002. It can be shown in equation (3). Therefore, when propanone concentration increases, the value of K remains the same. However, there are factors that can affect the reaction rate. The speed of the reaction was to be 0.7. The general reaction can be expressed as (5). (5) Introduction My essay focuses on the chemical cynical one, which is only 100 years of the subcampus of chemistry. This is due to its Reaction mechanism. This means that if it increases a concentration of propanona or Ejido, the rate also increases, in the coating ... This laboratory, we recorded whether the reaction remained the same, or if the sub -speed or low speed as, determines the differences of time in the reaction. reaction.

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