CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
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Project Number
J0521

Project Title
Chemical Kinetics

Abstract

Objectives/Goals

Purpose

This project provides evidence that heat can speed the process for chemical reaction.

Hypothesis

If hydrogen peroxide, water, and KI are mixed together and shaken in different temperatures of water, then the warmer the water, the faster the reaction rate.

Methods/Materials

Materials: 3% Hydrogen peroxide; 0.1 molar KI (Potassium Iodine); water; trough; burette; 2 tubes; 125 mL Erlenmeyer flask; 60 mL syringe body; stand; clamp; two beakers; a burner; ice; thermometer; timer.

Procedures: 1. Set up all tubes and flasks (see diagram). 2. Fill with water until water in burette is near the zero mark. 3. Equalize pressure by moving the syringe body up and down. If there are no leaks, the water level in the burette will at first change, but then will stop. 4. Look for any bubbles in the tubes, and if there are any, make sure to get them out. 5. Fill trough with water of desired temperature. Keep a thermometer in it, and make sure to keep adding hot/cold water to keep at a constant temperature. 6. In the 125 Erlenmeyer flask combine 10 mL of 0.1 M KI, and 15 mL deionized water. 7. Add 5 mL 3% Hydrogen Peroxide to flask and quickly stopper it and start timer. 8. Place flask in trough, and start shaking it in the water as constantly as possible. 9. Record time at every 1 mL produced up to 14 mL. 10. Repeat steps 5-9 with flask in different temperatures of water.

Results

My experiment proved that the hotter the water that the chemials were in, the faster the reaction rate.

Conclusions/Discussion

The result was that the hot water increased the rate of the reaction. The reasoning behind this is that the molecules speed up and have more collisions. Also, cold water would slow down the molecules causing less collisions. When I put the reaction in really cold water, the water level went up and down in the burette. When it was taken out, and shaken, it finally went down. This could mean that when the chemical reaction was placed in the freezing water the gas compressed and got smaller, meaning that there was less gas, and the water level rose. ne error to be fixed would be to make sure that the temperature does not vary in a test-run. Also, when the chemicals were shaken, they were shaken by hand. A magnetic stirrer would have made the results more accurate.

Summary Statement

By hooking a chemical reaction up to a burette to measure the amount of gas produced and putting this reaction in different temperatures of water, I will be able to conclude how temperature affects chemical reactions.

Help Received

Parents helped with getting materials; Ms. Garza helped with original idea; Ms. Owens helped with difficult concepts and supplying equipment.