Lower Merion High School Chemistry

Iodine Clock Reaction

Lab #28

Most chemical reactions occur in a series of steps. In many instances, these steps are quite rapid and the reaction appears to occur instantaneously. However, some reactions have one step that occurs over a period of time. Changes in concentrations of reacting solutions and changes in temperature can affect the rate of the "slow" step in a reaction. We will attempt to examine the effect of these changes on the rate of a particular chemical reaction.

Materials:

Solutions A and B	Three 100 mL or 150 mL beaker		De-ionized water
Two test tubes	Two 10 mL graduated cylinders		Stirring rod
Ice	Bunsen burner	Stopwatch or other timer	Thermometer

Procedure:

Part A:

Obtain approximately 100 mL of Solution A and 100 mL of Solution B in separate beakers. Measure 10 mL of solution A in a graduated cylinder and pour the solution into one of the test tubes. Measure 10 mL of solution B in another graduated cylinder and pour it into the other test tube.

Prepare to time the reaction. Pour the contents of one test tube into the other, thereby mixing solutions A and B. As soon as you begin mixing the solutions, begin timing the reaction. Pour the solution back and forth from one test tube to the other until you observe a reaction taking place. Record the time of the reaction. Pour the solution down the sink and rinse both test tubes.

Place 10 mL of solution B into one of the test tubes. In the other test tube, place 9 mL of solution A and 1 mL of de-ionized water. Using the stirring rod, mix the water and solution A well. Then, repeat the previous procedure of combining the contents of the two test tubes. Again, record the time of the reaction. Repeat this procedure using 10 mL of solution B each time but using the following combinations of solution A and water:

Solution A	Water
8 mL	2 mL
7	3
6	4
5	5

Make certain to mix the solution A and water before combining the solutions from the two test tubes. Also, remember to time each reaction and record the time.

Part B:

Obtain approximately 70 mL of solution A in a beaker and 70 mL of solution B in another beaker. Measure 10 mL of solution A in a graduated cylinder and pour this solution into a clean test tube. Measure 10 mL of solution B and pour it into another test tube. Prepare an ice water bath. The water in the bath should be about $5^{o}C$. Place the two test tubes into the water bath. Allow the test tubes to remain in the water bath for 3 minutes. Take the temperature of the water bath and record the temperature. Then, mix the two solutions as you did in Part I. Record the time required for the reaction to take place. Pour the solution into the sink and rinse the test tubes. Repeat this procedure using water baths of $15^{o}C$, $25^{o}C$, $35^{o}C$, $45^{o}C$ and $55^{o}C$.