**Iodine Clock Reaction**

**Purpose:** The purpose of this experiment is to observe the iodine clock reaction and the effects of concentration, temperature and a catalyst have, if any, on the reaction.

**Preparation:**

Your teacher will supply each lab table with the following solutions: 0.05 M KIO3, starch 2%, 0.20 Na2S2O5. You will need to prepare 5 beakers according to the following table. These will be your A solutions. (You will do these one at a time and clean your beakers out in between each trial)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Beaker 1A** | **Beaker 2A** | **Beaker 3A** | **Beaker 4A** | **Beaker 5A** |
| 0.05 M KIO3 | 5 mL | 8 mL | 10 mL | 5 mL | 5 mL |
| D.I. water | 15 mL | 12 mL | 10 mL | 15 mL | 15 mL |
| Temperature | Room | Room | Room | 45°C | 10°C |

Prepare a series of five identical solutions called **Solution B** (1B–6B) by mixing 1 mL of 0.20 M Na2S2O5, 3 mL of starch solution, and 4 mL of distilled or deionized water in 50-mL beakers. Keep each of the solutions at room temperature. This solution may be already prepared by your teacher. In that case, use 8mL of the solution prepared as **Solution B**.

**Procedure** (After each trial, rinse out any beaker or graduated cylinders used to prepare for the next trial)

1. *Control Reaction.* Pour 8mL of Solution B into Solution 1A. Stir. Carefully time the reaction with a stopwatch or timer. Record the time from when the two solutions are mixed until the appearance of the blue color.

2. *The Effect of Concentration upon Reaction Rate.* Pour 8mL of Solution B into Solution 2A. Record the time from when the two solu­tions are mixed until the appearance of the blue color. Repeat with Solution 3A.

3. *The Effect of Temperature upon Reaction Rate.* Pour 8mL of Solution B into Solution 4A. Record the time from when the two solu­tions are mixed until the appearance of the blue color. Repeat with Solution 5A.

**Calculations:**

For each trial, calculate the concentration of KIO3 used. Use the equation for dilutions M1 x V1 = M2 x V2

Trial 1:

Trial 2:

Trial 3:

Trial 4:

Trial 5:

**Data Table:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 |
| [KIO3] |  |  |  |  |  |  |
| Temperature |  |  |  |  |  |  |
| Time for color to appear (sec) |  |  |  |  |  |  |

**Questions:**

1.) What effect did concentration have on the time? Explain your reasoning by describing what is happening on the molecular level (think of the collisions).

2.) What effect did temperature have on the time? Explain your reasoning by describing what is happening on the molecular level.

3.) Predict the time it would take if this reaction was carried out with 2.5 mL of KIO3 and 17.5 mL of deionized water at room temperature. Show your work and explain your answer using data collected from this lab.

4.) Predict the time it would take if reaction 1 was carried out in the presence of a catalyst. Explain your reasoning.

**Conclusion:**