MICRO-LAB

Rate of a Chemical Reaction

OBJECTIVES

- ***Prepare*** **and** ***observe*** **several different reaction mixtures.**
- ***Demonstrate*** **proficiency in measuring reaction rates.**
- ***Relate*** **experimental results to a rate law that can be used to predict the results of various combinations of reactants.**

MATERIALS

- **8-well microscale reaction strips, 2**
- **distilled or deionized water**
- **fine-tipped dropper bulbs or small microtip pipets, 3**
- **solution A**
- **solution B**
- **stopwatch or clock with second hand**

BACKGROUND

In this experiment, you will determine the rate of the reaction whose net equation is written as follows:

$$3Na_2S_2O_5(aq) + 2KIO_3(aq) + 3H_2O(l) \xrightarrow{H^+} 2KI(aq) + 6NaHSO_4(aq)$$

One way to study the rate of this reaction is to observe how fast $Na_2S_2O_5$ is used up. After all the $Na_2S_2O_5$ solution has reacted, the concentration of iodine, I_2, an intermediate in the reaction, increases. A starch indicator solution, added to the reaction mixture, will change from clear to a blue-black color in the presence of I_2.

In the procedure, the concentrations of the reactants are given in terms of drops of solution A and drops of solution B. Solution A contains $Na_2S_2O_5$, the starch indicator solution, and dilute sulfuric acid to supply the hydrogen ions needed to catalyze the reaction. Solution B contains KIO_3. You will run the reaction with several different concentrations of the reactants and record the time it takes for the blue-black color to appear.

SAFETY

For review of safety, please see the **Safety in the Chemistry Laboratory** in the front of your book.

PREPARATION

1. Prepare a data table with six rows and six columns. Label the boxes in the first row of the second through sixth columns "Well 1," "Well 2," "Well 3," "Well 4," and "Well 5." In the first column, label the boxes in the second through sixth rows "Time reaction began," "Time reaction stopped," "Drops of solution A," "Drops of solution B," and "Drops of H_2O."