LAB 3-Factors Affecting Reaction Rate

INTRODUCTION. In this experiment students will plot data and determine the relationship between reaction rate and the following factors: temperature and concentration

PART A, the decomposition of permanganate ion (MnO₄) in an acidic oxalic acid solution at different temperatures is examined and the data collected. The reaction between permanganate ion and oxalic acid in acid solution is:

2 MnO₄⁻(x₀) + 5 H₂C₂O_{4(x₀)} + 6 H⁺(x₀)
$$\rightarrow$$
 2 Mn²⁺(x₀) + 8 H₂O₍₀₎ + 10 CO₂₍₀₎ 2.2 (colorless)

Because the only species with a distinct color is MnO₄⁻, which is purple, the reaction can be monitored by the loss of color. The reaction is assumed to be complete when the color disappears. Use data provided to complete lab

PART B, the effect of concentration of the reactants in an iodine clock reaction will be considered. The reaction is shown below:

$$2 \text{ HIO}_{3(80)} + 5 \text{ H}_2\text{SO}_{3(80)} \rightarrow \text{I}_{2(80)} + 5 \text{ H}_2\text{SO}_{4(80)} + \text{H}_2\text{O}_{(1)}$$
 2.4

Iodine in aqueous solution has a pale-yellow color at low concentrations and may be difficult to monitor. Because starch forms a deep-blue complex with iodine a 2% solution of starch is added to enhance the detection of iodine as shown below:

In this equation, the free iodine appears only after a fixed amount of sulfurous acid has been consumed. At that point the iodine reacts with the starch to from the complex and the deep blue color is observed.

Data was collected for various concentration of HIO3.

Use data provided to complete lab

Factors Affecting Reaction Rates 1 Answers

SJ Ball

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