**Practical 8: The rate of the reaction between iodine and propanone with a hydrochloric acid catalyst**

**Student worksheet**

**Questions**

1. The equation for the reaction is:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CH3COCH3(aq)** | **+** | **I2(aq)** | **** | **CH3COCH2I(aq)** | **+** | **H+(aq)** | **+** | **I-(aq)** |

Write the rate equation for this reaction.

1. What is the overall order for the reaction?
2. Why was water added to some of the reaction mixtures?

**Analysis of results**

* Compare the rates for run A and B to determine the order with respect to HCl
* Compare the rates for run A and C to determine the order with respect to Propanone
* Compare the rates for run A and D to determine the order with respect to Iodine

**Safety**

* Wear a lab coat and safety spectacles, tie long hair back.
* 2M HCl is corrosive

**Objective**

* Be able to find the order of reaction with respect to the iodide ion.
* Be able to find the order of reaction with respect to propanone.
* Be able to find the order of reaction with respect to hydrochloric acid

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**Procedure**

1. Prepare 4 burettes with 2M HCl, 2M propanone, 0.01M iodine and distilled water.
2. Make up 4 mixtures in small beakers of hydrochloric acid, propanone and water labelled A – D using the burettes.
3. In 4 test tubes prepare the volumes of Iodine solution for A – D.
4. Add test tube A to conical flask A and measure the time taken in seconds for the colour of iodine to disappear. Repeat for B – D and fill in the table:

**Table 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | **Run A** | **Run B** | **Run C** | **Run D** |
| **Vol 2M HCl / cm3** | **20** | **10** | **20** | **20** |
| **Vol 2M propanone / cm3** | **8** | **8** | **4** | **8** |
| **Vol Water / cm3** | **0** | **10** | **4** | **2** |
| **Vol 0.01M I2 / cm3** | **4** | **4** | **4** | **2** |
| **Time for colour to disappear** |   |   |   |   |
| **Rate / cm3 s-1** |   |   |   |   |

1. Calculate the rate by volume of iodine divided by time taken in seconds.

**Equipment/materials**

* 100 cm3 0.01 mol dm–3 Iodine
* 500 cm3 2 mol dm–3 Propanone
* 1000 cm3 0.1 mol dm–3 hydrochloric acid
* Distilled/deionised water
* Four 100 cm3 beakers
* Four test tubes
* 4 Burettes
* Stopwatch
* White tile