**The Iodine Clock Reaction**

**Starch**

* Is a complex carbohydrate i.e. a large polymer made up of individual monomers of sugar bonded together

**Monomer Glucose**



* Simple sugars (monomers) bonded together = Complex carbohydrates (polymers)

**Polymer Starch**



* It is how plants store sugar for energy when required. Humans do the same thing in their livers—we store **glycogen**.

**Iodine Solution as an Indicator**

* is an aqueous solution of iodine ( ) and potassium iodide ( )
* The colour of the iodine solution is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Iodine Test for Starch**

|  |  |
| --- | --- |
| **Iodine + Food** | **Colour** |
| **Sugar** |  |
| **Pasta** |  |
| **Flour** |  |

**Conclusions:**

What do indicators do? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Iodine + Simple Sugars = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Iodine + Starch = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**The Effect of Concentration of KIO3 (Solution A) on Reaction Rate**

i) pour 10.0 mL of A into the Erlenmeyer flask

ii) start the stopwatch as soon as you pour 10.0 mL of B into the flask (when B hits the surface of A

iii) stop timing as soon as the reaction is over

iv) rinse out the flask and shake

v) repeat according to the table below—**exactly** the same way!!!!

**Solution A = 0.020 mol/L KIO3**

**Solution B = 0.020 mol/L NaHSO3**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Volume Solution A (mL)** | **Volume H2O (mL)** | **[Concentration A]** | **Time (s)** | **Rate in Terms of A (mol/Ls)** |
| **10.0** | **0.0** |  |  |  |
| **8.0** | **2.0** |  |  |  |
| **7.0** | **3.0** |  |  |  |
| **5.0** | **5.0** |  |  |  |

**The Effect of Concentration of NaHSO3 (Solution B) on Reaction Rate**

i) pour 10.0 mL of B into the Erlenmeyer flask

ii) start the stopwatch as soon as you pour 10.0 mL of A into the flask (when A hits the surface of B

iii) stop timing as soon as the reaction is over

iv) rinse out the flask and shake

v) repeat according to the table below—**exactly** the same way!!!!

**Solution A = 0.020 mol/L KIO3**

**Solution B = 0.020 mol/L NaHSO3**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Volume Solution B (mL)** | **Volume H2O (mL)** | **[Concentration B]** | **Time (s)** | **Rate in Terms of B (mol/Ls)** |
| **10.0** | **0.0** |  |  |  |
| **8.0** | **2.0** |  |  |  |
| **7.0** | **3.0** |  |  |  |
| **5.0** | **5.0** |  |  |  |

**Sample Calculations:**

1) Concentration of Solution A when 8.0 mL of A are mixed with 2.0 mL of water:

2) Rate in terms of A in mol/Ls when 8.0 mL of A are mixed with 2.0 mL of water:

3) Determine the rate law for the reaction:

Determine the rate constant k:

Rate Law Expression: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_