

C6 Knowledge Organiser – 4.6.1 – Rates of reaction



Effect of temperature 1

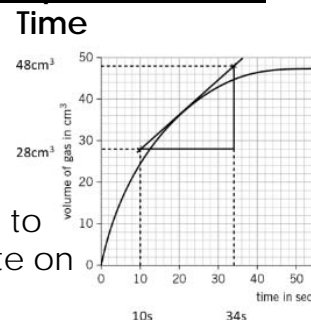
- Increase temperature
- Particles gain thermal energy
- Particles move more
- **Causes more successful/frequent collisions**
- **Rate increases**

Effect of Concentration 2

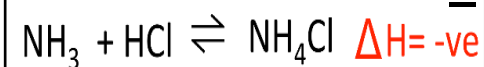
- Increase concentration
- More particles in the same volume
- **Causes more successful/frequent collisions**
- **Rate increases**

Calculating rate 5

Amount of product made



Reversible reactions 6



The forward reaction gives out HEAT (exothermic)

The reverse reaction absorbs HEAT (endothermic)

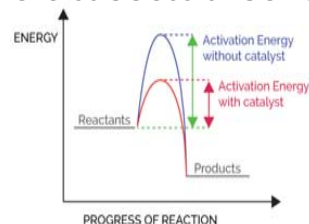
Equilibrium – forward and reverse reactions occur at the same rate
Same amount of energy transferred in each direction

Effect of Surface area 3

- Increase surface area
- More surface for reactant particles to collide
- **Causes more successful/frequent collisions**
- **Rate increases**

Effect of catalysts 4

- Lowers activation energy
- More particles have enough energy to react
- **More successful collisions**



Measuring Rate

(c) doc b

cotton wool plug to stop spray loss

MASS LOSS METHOD

typical results are shown below

↑ gas

reactants eg hydrochloric acid and marble chips losing carbon dioxide gas

98.26 g

one pan electronic balance

mass of flask in g

time

the initial gradient gives the initial speed of reaction

mass loss curve

Required practical – Change in turbidity

- **Independent** – Temperature/ concentration of acid
- **Dependent** – Time for Cross to disappear
- Control** – volume of acid

add dilute acid and start timing

sodium thiosulphate solution

a cross drawn on paper

Time how long it takes for the cross to disappear

Required practical – Gas volume

(c) Doc Brown

A graph of typical results is shown below

gas syringe

rubber tubing connection

stand and clamp

stopwatch/timer

rubber bung

↑ gas

reactants

conical flask

volume of gas formed

measuring the initial rate of reaction eg cm³/min.

fastest at the start

reaction slowing down

reaction stopped

time