Looking at nitrogen oxide, as the concentration doubles the rate quadruples. This suggests the order with respect to NO is 2nd.

Calculating k

Knowing the orders of H_2 and NO, we can calculate K at the given temperature of the reaction.

We take one of the experimental conditions in the table, and inset our known values in the rate equation:

$$4.8 = k\ [2.0][2.50]^2$$

We then simply rearrange the equation to give K:

$$\frac{4.8}{[2.0][2.50]^2} = k = 0.384$$

To calculate the units of K, we need to look at the units of the reactants (INCLUDING POWERS)

$$\frac{moldm^{-3}s^{-1}}{[moldm^{-3}][mol^2dm^{-6}]}$$

The $moldm^{-3}$ on the top and bottom cancel one another out, so we simply need to switch the signs on the units of the mol^2dm^{-6} and incorporate the s^{-1} (from the rate) to give K the units of $mol^{-2}dm^3s^{-1}$.

Preview from Notesale.co.uk
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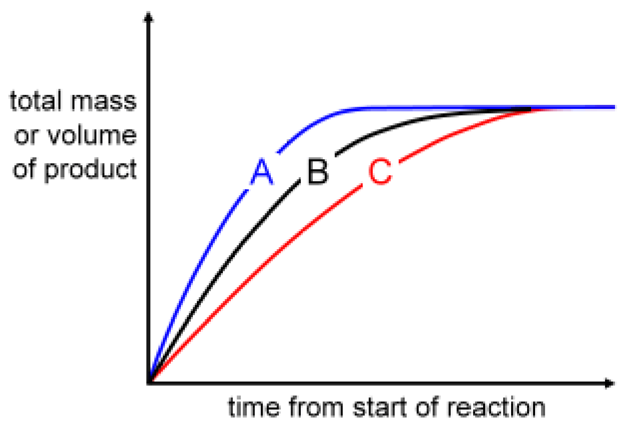
Understand the laboratory method which can be used to follow the course of a reaction

- Measure the volume of gas evolved from a reaction using a gas syringe
- Measure the change in mass of a reaction mixture (e.g. mass loss due to evolution of gas)
- Monitor Ph
- Colorimetry
- Titration (quenching
  - Neutralise samples of the reaction mixture at regular intervals then analyse the progress of the mixture using titration



Once a reaction mixture of a particular concentration over time has been recorded in a graph, the shape of the graph is likely to appear a steep curve which gradually flattens out.