WJEC Chemistry GCSE

Specified Practical 9C

Catalysts for the Decomposition of Hydrogen Peroxide

[Methods are adapted from the Royal Society of Chemistry]

England Specification

Hydrogen Peroxide

Hydrogen Peroxide reacts to form a foam. This can be used to measure how the rate of reaction is affected by the different catalysts used by observing how fast it rises up the measuring cylinder.

Aim

To investigate the effect of various different catalysts on the decomposition of hydrogen peroxide by measuring the rate of reaction.

Apparatus

- Several 250 cm^3 measuring cylinders (one for each catalyst to be used)
- Large tray to catch any foam that spills over
- Stopwatch
- 75 cm^3 of hydrogen peroxide solution
- 0.5 g of powdered manganese(IV) oxide
- 0.5 g of lead(IV) oxide
- 0.5 g of iron(III) oxide

Method

1. Line up five 250 cm^3 measuring cylinders in a tray. Add 75 cm^3 of water to the 75 cm^3 of hydrogen peroxide solution to make 150 cm^3 of solution.
2. Place about 1 cm^3 of washing up liquid into each of the measuring cylinders.
3. To each one add the amount of catalyst specified above.
4. Add 25 cm^3 of hydrogen peroxide solution to each cylinder and add the catalyst as simultaneously as possible.
5. Start timing as the foam rises up the cylinders.
6. Time how long each foam takes to rise to the top of the cylinder.
7. Place a glowing splint in the foam; it will re-light confirming that the gas produced is oxygen.

Safety Precautions

- Hydrogen peroxide solution is corrosive.
- Avoid contact of the catalysts with aluminium and other metal powders as reactions can occur.
- Manganese(IV) oxide is harmful
- Lead dioxide is a reproductive toxin and harmful if swallowed or inhaled.