

Teacher's Instructions – Cannon Fire

For Demonstration Only



Make sure you have...

Crystallising dish

Hydrogen peroxide (H₂O₂, 100 Volume)

Potassium permanganate (Manganate (VII) KMnO₄)

Ethanol

Spatula

Matches

Taper

2 x heatproof mats

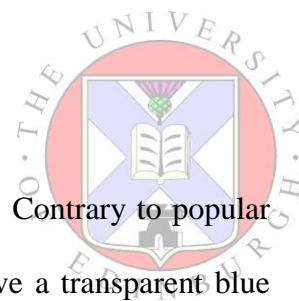
Measuring cylinder

What to do...

1. Measure 20 ml ethanol, 5 cm³ hydrogen peroxide and 20 ml water into the crystallising dish on a heatproof mat. Place a second heatproof mat to one side.
2. Light the solution with a taper
3. Scoop the end (tiny amount!) of a spatula of potassium permanganate and tip it into the crystallising dish

You should see an increase in the size of the flame and hear a popping sound

4. Extinguish the flame by placing the second heatproof mat on top of the crystallising dish
5. Wash everything up (solution can go down the sink).



What's Happening?

Potassium permanganate oxidises hydrogen peroxide to produce oxygen (NB. Contrary to popular belief, the potassium permanganate is NOT a catalyst). Ethanol burns to give a transparent blue flame. When you add the potassium permanganate, it reacts with the hydrogen peroxide to produce oxygen in small “pockets”.



These pockets of oxygen increase the intensity of the reaction and you get the cannon fire noise as the pockets of oxygen hit the flame.

If you look carefully when the flame erupts, you can sometimes see a violet colour. This is because there is a metal in a flame – potassium. Potassium gives a violet flame colour.