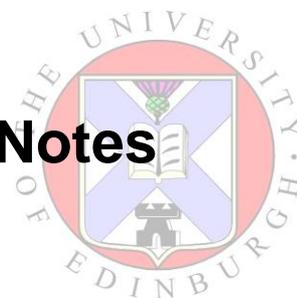


The Bottle Rocket - Technicians Notes

Advance Preparation



Chemicals

Sodium hydroxide (NaOH) pellets

Aluminium foil

Hydrogen peroxide (H₂O₂, 30 %, 100 Volume)

Potassium permanganate (KMnO₄)

Equipment

Test tube with side arm

Test tube stopper

Rubber tubing

Microspatula

Plastic pipette with the bulb cut off

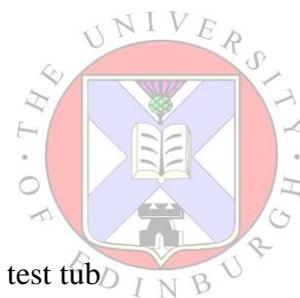
500 ml fizzy drinks bottle with lid (Coke/Irn Bru bottles are best)

Sellotape

Water bath/sink

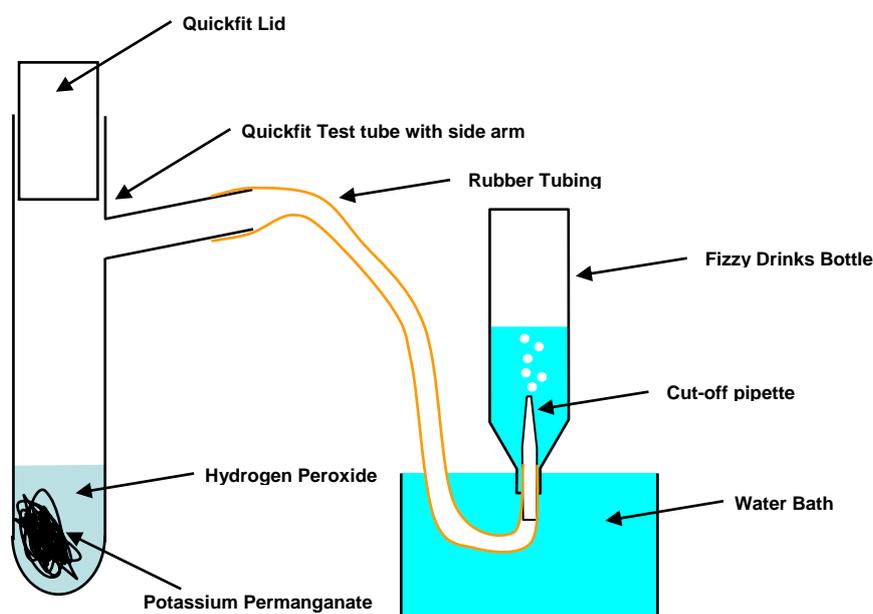
Preparation Instructions

1. Reinforce the bottle by wrapping sellotape round it.
2. Prepare a 6 M solution of sodium hydroxide (240 g NaOH in 1 l water)
3. Attach the rubber tubing to the side arm of the test tube
4. Push the cut-off plastic pipette in the other end of the rubber tubing
5. Clamp your newly-made bubbling apparatus (it will get hot!)
6. Fill the water bath/sink



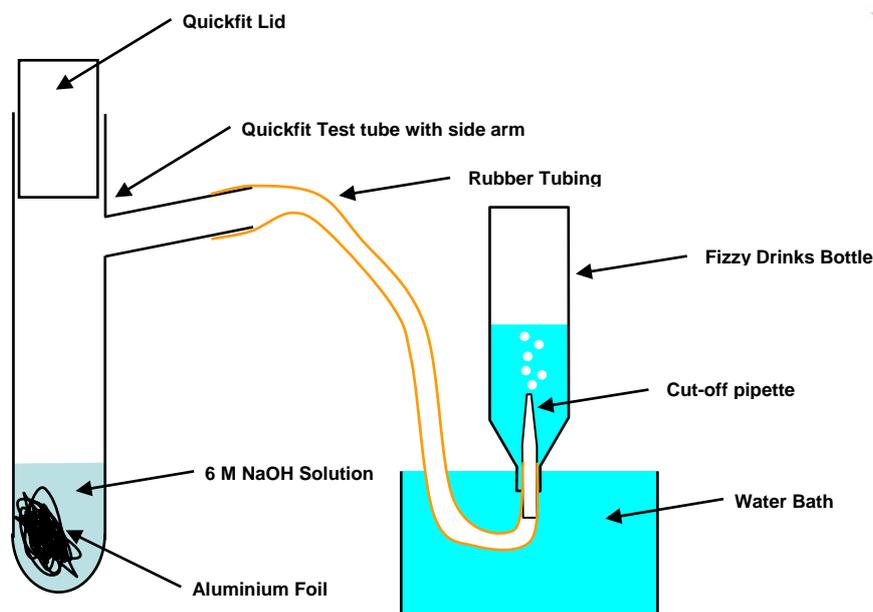
7. Allow the fizzy drinks bottle to fill with water
8. Put a small lump of aluminium foil in the test tube
9. Measure 20 cm³ of sodium hydroxide (6 M) solution onto the foil in the test tube
10. Stopper the test tube
11. Put the plastic pipette in the bottle and allow it to half-fill with hydrogen as shown below.

NB – the hydrogen:oxygen mixture must be 1:1. If there is too much hydrogen it can go off with no delay after putting in the palladium. DO NOT USE A 2:1 MIX!



12. Get someone to hold the bottle upside-down in the water while you clean the bubbling apparatus (or use a new, clean set of apparatus!).
13. Set up the apparatus again as in instructions 2.-3.
14. Measure 20 cm³ of hydrogen peroxide (100 V, 30 %) into the test tube.
15. Scoop the end of a microspatula of potassium permanganate (KMnO₄) into the hydrogen peroxide.
16. Stopper the test tube
17. Put the plastic pipette in the bottle and allow it to half-fill with oxygen as shown below

NB – the hydrogen:oxygen mixture must be 1:1. If there is too much hydrogen it can go off with no delay after putting in the palladium.



18. Put the lid tightly on the fizzy drinks bottle. You can put microfilm round the lid if you want to use the bottle later. It will hold the gasses for a few days.

Preparation for Demo

The Teacher Will Need...

500 ml fizzy drinks bottle prepared as above

Palladium on charcoal (5 % Pd)

Cut out plastic pipette (as shown below)

Tongs

Spatula

Clamp stand



Plastic pipette with the bulb cut in half

Preparation...

1. Clamp the bottle with the clamp stand on a desk/chair where it can be seen but is out of the way of low ceilings. The class should be at least 5 m away.