

## 21: Hydrogen Balloons

Hydrogen is a colourless, odourless gas which can form explosive mixtures with air as you are about to find out! Hydrogen is a very clean fuel because the product of the burning reaction is water!

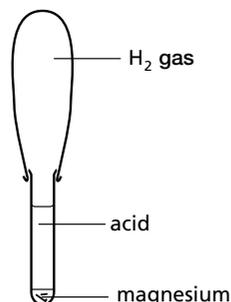
### What you will need

small plastic food bags or a bag of round balloons	cotton
boiling tubes (about 5) and rack	newspaper
pipette or similar to dispense 5 to 10 cm <sup>3</sup> of acid	elastic bands
spatulas	
sellotape	magnesium ribbon or filings
eye protection	hydrochloric acid

### What you do

-   Put the boiling tubes in a rack.
- Add 5 cm<sup>3</sup> of acid to each boiling tube.
- Blow into a plastic bag and secure the open end with an elastic band. If you are using balloons, blow your balloon up to pre-stretch it so that when you come to fit it over the neck of a boiling tube it will stretch more easily. Let the air out until it is about half-inflated and twist its neck, or tie it with an elastic band to keep the air in.
-  Ask your friend to put several centimetres of magnesium ribbon (or a spatula measure of magnesium filings) into one of your boiling tubes.
- When the reaction is bubbling vigorously use an elastic band to attach the opening end of your plastic bag to the tube and collect the hydrogen gas. If you are using a balloon stretch its neck over the end of the tube.
- When the reaction is finished, close the plastic bag with an elastic band or twist the neck of the balloon so that no gas escapes.
- Add the same amount of magnesium ribbon or filings to the next boiling tube.
- Attach the same plastic bag or balloon to this second tube as soon as the gas is coming off vigorously.
- Repeat this procedure until you have collected gas from all the boiling tubes.
- Secure the plastic bag with an elastic band or tie a knot in the neck of the balloon and attach two pieces of cotton to it. The first piece of cotton should be attached to the top of the bag or balloon using sellotape and the second attached to the sealed end of the bag or neck of the balloon.  
Repeat steps 1-10 to fill another bag or balloon.

How to fill your bag or balloon



eye protection must be worn



EXOTHERMIC REACTIONS



EXPLOSIVE  
hydrogen gas



bubbles of hydrogen can cause hydrochloric acid to spit



IRRITANT  
hydrochloric acid

**21: Hydrogen Balloons (contd)**

11. Fix the first piece of cotton to the ceiling using sellotape (this keeps the bags or balloons in place). The second piece of cotton will act as a fuse.
12. Spread newspaper over the floor under the bags or balloons.
13. Light the fuse and stand back.
14. The smaller bags or balloons make a small pop and melted plastic falls to the floor. The bigger bags or balloons are more spectacular.
15. Depending on how adventurous you are, you can light the fuses one at a time or connect them all to each other to get a chain reaction!

