Demonstration corner

The elephant's toothpaste
This is a fun, yet simple demonstration showing the exothermic catalytic breakdown of hydrogen peroxide.

Preparation
You will need:
- A 250 or 500 cm^3 measuring cylinder.
- A bowl of some sort to stand it in (a washing up bowl is fine).
- 1.4 g of potassium iodide crystals
- 60 cm^3 of hydrogen peroxide (100 vol).
- 1 cm^3 (or so) of washing-up liquid.
- A few drops of food colouring.

Carrying out
1) Wear eye protection (demonstrator).
2) Make sure the audience is standing at least 1 m back.
3) Place the measuring cylinder in the bowl.
4) Pour the hydrogen peroxide into the measuring cylinder and add the washing-up liquid and food colouring.
5) Drop the potassium iodide crystals into the liquid at the bottom of the cylinder.

After a second or two's delay, you will see foam moving rapidly up the measuring cylinder, coloured by whatever colouring you have used. It will rapidly start to pour out of the top and pile up in the bowl (assuming you remembered to put one there!) like toothpaste being squeezed from a tube.

You will also notice steam rising from the foam as the reaction is highly exothermic.

It is possible to use less concentrated hydrogen peroxide but the reaction is slower and less spectacular - which in part defeats the object.

If you put the food colouring down the side of the measuring cylinder, you can use more than one colour and get 'toothpaste' with stripes.

An interesting variation is to have two experiments side by side. Add the potassium iodide to one and at the same time add a piece of liver to the other. Liver, as you will probably know, contains the enzyme catalase which catalyses the breakdown of hydrogen peroxide.

You will see the foam in the tube with the liver starting off faster but stopping, sometimes before it gets out of the top of the tube. The reason is that, as a protein, the catalase is denatured by the heat of the decomposition and thus the reaction stops. A useful comparison between enzymes and inorganic catalysts. ◄