

# Demonstration corner

## The Whoosh Bottle

This is a tremendous demonstration from the RSC showing the exothermic nature of the combustion of alcohol. It looks particularly spectacular in a darkened room.

### Preparation

You will need:

- An 18 litre, polycarbonate, “water-fountain” bottle. (There will be a PC mark if it is polycarbonate). Check the container for signs of cracks or frosting. If there are any, do not use. Make sure the container is clean and dry inside.
- A metre rule and some tape.
- Wooden splint.
- 40 cm<sup>3</sup> Industrial denatured alcohol (IDA is highly flammable) [1].

### Carrying Out

- 1) Wear eye protection (demonstrator and onlookers).
- 2) Place the container so that there is at least 2.5 m of clearance between the top of the bottle and the ceiling - and that there is nothing above it that could catch light.
- 3) Ensure anything flammable (such as your ethanol) is at least 1 m from the bottle.

- 4) Ensure audience is more than 4 m away from the bottle.
- 5) Pour the alcohol into the container and insert a rubber bung. Roll the bottle on its side for 10 seconds.
- 6) Drain any excess alcohol back into the original bottle and remove to at least 1 m away from the demonstration area. Use care when removing the bung to ensure that any excess alcohol does not spray out.
- 7) Wipe off any excess alcohol from the outside of the bottle.
- 8) Attach a splint in a downward angle to the end of a metre rule.
- 9) Light the splint and hold over the neck of the bottle.

You will hear quite a loud ‘whoosh’ and see a blue flame (if the room is darkened) as the ethanol vapour burns rapidly.



Figure 1 - Whoosh bottle with methanol.

On picking up the bottle afterwards, it is noticeably hot to the touch, though not too hot to hold. ◀

### References

- [1] It is possible to use some other alcohols: Methanol will give a similar effect to ethanol but as it is much more toxic, there would seem to be no point. Propan-1-ol and propan-2-ol can also be used, they burn a little more slowly and you see bits of yellow in the flame rather than just blue.