Work out the mass of the primary standard you need for the chosen molarity of your solution. Weigh out slightly more than this mass - this measured mass need not be accurate. Dry your solid in an oven - usually at about 110-120°C and allow your chosen standard to cool in a dessicator.

Using the dried material, weigh out the exact amount of solid needed to make your solution and place it into a volumetric flask. Dissolve the material in less than the final amount of distilled/deionised water (ideally boiled out and cooled to remove dissolved gases). Use more of the distilled water to wash out the weigh boat and add the washings to the flask. Top up to the mark on the volumetric flask to obtain your standard solution.

It is a good idea to make up quite a concentrated solution that you can then dilute down - that way you will minimise any weighing errors.

Specific Examples

(See Table 1). This is just an overview. You will find details on how to standardise the above solutions on the SSERC website under the name of the solution to be standardised. Details of others can be found in books such as Vogel's 'Handbook of Quantitative Inorganic Analysis' [1]. If you do not have access to a suitable book and can't find the information on our website then get in touch and we'll find out for you.

References

[1] Svehla, G. (1996) Vogel's Qualitative Inorganic Analysis (7th Edition), Prentice Hall, ISBN-10: 0582218667.

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^3 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.

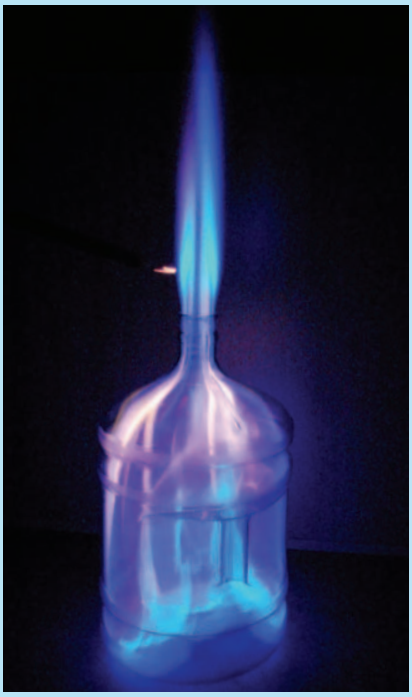

Figure 1 *- Whoosh bottle with methanol.*

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.