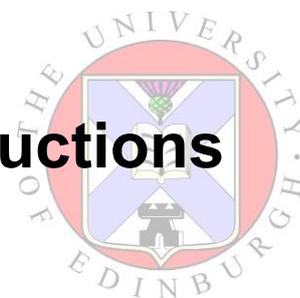


Flame Colours – Teacher's Instructions

For Demonstration Only



Make sure you have

Beaker (250 ml)

Saturated Calcium acetate Solution

Ethanol

Spatula

Lithium salt solution spray (LiCl in water)

Copper salt solution spray (CuCl₂ in water)

Sodium salt solution spray (NaCl in water)

2 Heatproof mats

What to Do...

1. Add about 50 ml of the calcium acetate solution to the beaker
2. Add ethanol and stir until a solid is formed (if no solid is formed add more ethanol!)
3. Scoop out the solid and place on a heatproof mat.
4. Light the solid.
5. Spray the flame with the Lithium salt solution

You should see a pink flame

6. Spray with the copper salt solution

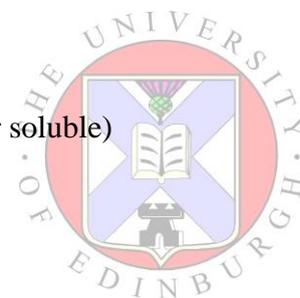
You should see a green flame

7. Spray with the sodium salt solution

You should see an orange flame

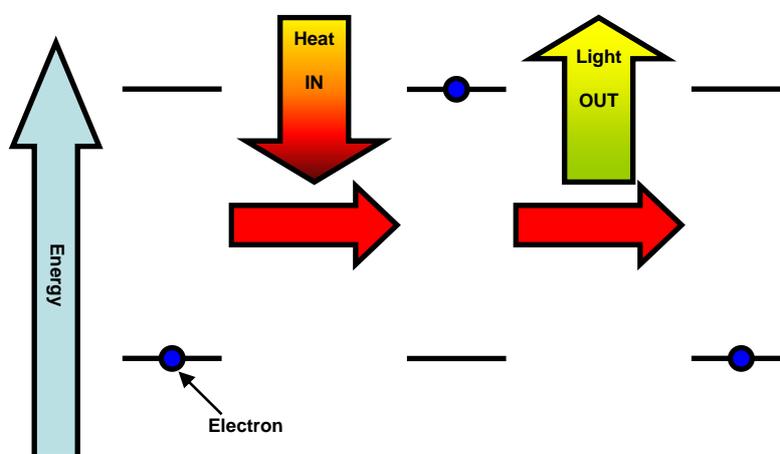
8. Put the flame out by placing the other mat on top of it

9. Wash everything up (solutions can go down the sink – the solid is water soluble)



What's Happening?

The solid you have made is a firelighter – similar to the white blocks that are often used to get a barbeque going on a rainy Scottish summer day! When you spray on a metal salt, the flame gives the electrons in the metal energy (**excitation**). This energy can then be lost again in the form of light (**emission**). The colour of the light depends on the metal: Lithium(I) gives a pink flame, Copper(II) gives a green flame and Sodium(I) gives a yellow flame.



This process is used extensively in Chemistry to determine what type and concentration of atoms a substance contains. Chemists basically burn the substance and measure the frequency (*i.e.* colour) of the light that's given out. This process is called "Atomic Emission Spectroscopy".

These colours are also often used in fireworks to give the different colours that amaze audiences at a firework display. The yellow colour for sodium should be particularly familiar as this is the same colour that comes from the sodium bulbs in streetlamps.