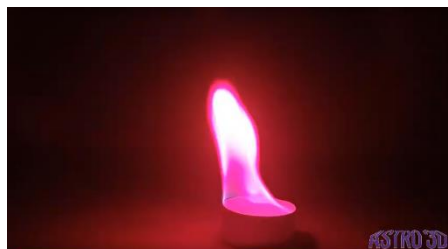


Understanding Galaxies Using Coloured Flames

SAFETY WARNING: Wear protective gloves and glasses and work in a well-ventilated room. Observe safety rules when working with fire and flammable liquids.

Equipment

- Tea-light candle holders
- Methylated spirits, isopropyl alcohol, or similar lighter fluid
- Long-handled lighter
- Cooking tray to smother flames
- The following ingredients:



Chemical	Common Item	Colour
Alcohol/methanol	Methylated spirits, isopropyl alcohol	Blue
Boric acid	Borax (multipurpose cleaner)	Green
Sodium chloride	Table salt	Yellow
Calcium chloride	Damp Rid (moisture absorber)	Orange
Lithium	Lithium batteries (see extraction steps)	Pink/red
Potassium chloride	Replacement table salt (KCl)	Purple
Magnesium	Epsom salts	White

Method

1. Place a large spoonful of the chemical into a tea light candle holder. Carefully pour in the lighter fluid to cover the chemical completely.
2. Use the long-handled lighter to set the fluid alight.
3. Watch as the colour of the flame changes.
4. Place the metal tray onto the candle holder to smother the flames.
5. Carefully discard of products.

Notes

- If the chemical is in a powder or liquid form, it will improve the colour. Chemicals that come in a flake form can be crushed into a finer powder.
- Let the chemical sit in the lighter fluid for a while before burning to improve the colour.
- A lighter fluid that burns with a clearer flame will produce better results.
- If you cannot extract lithium from a battery, it is also possible to use strontium chloride to make a red flame.
- This experiment also works well in a science classroom, using the salts in a spray test over a Bunsen burner.

DISCLAIMER: ASTRO 3D excludes all liability to any person arising directly or indirectly from undertaking this activity.

Extracting lithium from battery

SAFETY WARNING: Wear protective gloves and glasses as the materials inside the battery can burn exposed skin. It is very easy to short-circuit a battery, causing it to catch fire. If this happens, simply place the battery on a fire-safe surface and let it burn itself out.

- Use wire cutters to cut the casing around the positive end of an unused standard lithium battery. At this stage, beware of the battery short-circuiting – it will begin to feel warm. Cutting the top away as quickly as possible and removing the upper terminals will minimise the risk of a short circuit.
- The lithium is rolled up as a foil inside the battery (it is the dull, softer foil). Remove it carefully, cut a piece of lithium foil and place straight into lighter fluid. The lithium will react with oxygen in the air and so needs to be placed straight into the lighter fluid.
- The remaining battery components should be wrapped up and discarded.