Colourful flames – how fireworks are made

Autor:

Magdalena Blicharska

Data dodania:

19.06.2018

Słowa kluczowe:

fajerwerki,fire,próba płomieniowa,zabarwianie płomienia

DZIEDZINA:

Physics,Art

Cel doświadczenia:

Why do fireworks have so many colours? It any special dye added to them? Why do different substances placed in the burner flame give it different colours? The purpose of the experiment is to check what is responsible for giving colours to flares and fireworks. The experiment is also intended to make club members familiar with the colours that different salts give to flames.

Spis materiałów:

1. water
2. alcohol (spirit)
3. table salt, NaCl
4. potassium chloride (KCl – potassium fertilisers)
5. copper sulphate ($CuSO_45H_2O$ – fertiliser, plant protection product, fungicide)
6. aerosol bottles (atomisers)
7. a burner
8. a lighter
9. glass vessels /a beaker
10. a glass rod / a plastic spoon
11. volume measuring container
12. protective gloves
13. protective glasses
14. a lab coat

Fertilisers are available at gardening shops, shops selling equipment and reagents for schools and online shops.

!!!!CAUTION!!!! – The experiments involve high temperatures and burn risk. Be extremely careful! Work only under adult supervision.

Etapy realizacji:

1. Pour a teaspoonful of salt into a glass vessel, add approx. 15 mL water and 45 mL alcohol. Mix altogether. Remember to prepare solutions of different salts (NaCl, KCl and $CuSO_4$) in separate vessels.
2. Pour the content of each vessel to separate aerosol bottles. If the salt do not dissolve completely, avoid getting the undissolved residues in the bottle as they might clog the nozzle.
3. Fire the burner and gently spray each solution at a time towards the flame (**keep distance from the burner!!!!**). Wait several seconds before you spray again so that the previous colour disappears.

Pytania do doświadczenia:

1. What colour is produced by sodium salts?
2. What colour is produced by potassium salts?
3. What colour is produced by copper salts?

Opis zjawiska:

Ciekawostki:

1. Fireworks were invented by the Chinese and they are the main manufacturer even today. Initially, fireworks made a loud bang, like firecrackers today. They were used not only as an attraction but also as element of religious rituals.
2. The same phenomenon of flames being coloured which is used in fireworks, is also used in laboratory analyses of chemical compounds. A compound (melted or dissolved) is introduced into burner flame and the colour of the flame indicates which metal is a component in the compound.
3. In the course of cooking (e.g. water, a soup or potatoes) on a gas cooker, when some of the content of the pot drips onto the burner, gas will burn with yellow and orange flame. It is the sodium ions contained in water that colour the flame.