

D4: Gas Explosion

The gas used in laboratory Bunsen burners (methane) normally burns with a blue or yellow flame. However, mixtures with air explode when the concentration of the methane is between 5 and 15%. The following is a way of demonstrating the explosive route.



eye protection
must be worn

● Preparation and demonstration time 5 minutes

Requirements

Bunsen burner
Pringles tube (tall type) or similar
tripod
taper

Method

- 1 Take a cardboard tube with a plastic lid (a tall Pringles tube, or similar). Cut holes in the metal bottom and the plastic lid with diameter 1 cm or less.
- 2 Put Bunsen burner tubing just into one hole and turn on the gas to fill the tube. Turn the gas off and put your fingers over the holes in the tube.
- 3 Place the tube on top of a tripod, with the metal base uppermost.
- 4 At arm's length light the top of the tube with a burning taper.

Initially the gas burns with a bright yellow flame. This flame reduces in size until it is barely visible. It is at this point that the combustion becomes explosive. The Pringles tube will leap about 30 cm in the air with a pop.

It is important to be patient when waiting for the pop - it can take up to one minute for the flame to die down and the explosion to happen. Sometimes the flame seems to disappear some time before the explosion occurs. A good flow of air into the bottom of the tube will speed up the demonstration.

Safety advice

Note the delay before the explosion - be patient!

Eye protection must be worn by all.

Do not attempt to light any other types of gas.

Discussion

Combustion, explosions, gas/air mixtures, gas safety.

The hole at the bottom of the tube is required to allow air to replace the burning methane. This effectively dilutes the methane until the air/gas mixture is explosive.