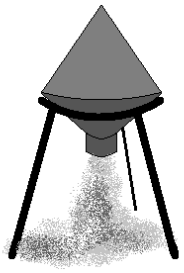
Hydrogen Rocket

Purpose

To demonstrate an exothermic reaction between hydrogen and oxygen in the presence of a combustible material.

Materials

Matches/Lighter	Watch glass
Lycopodium powder	Spoon
Ear protection (optional)	Rubber tube for H_2 gas
Metal Rocket Apparatus	Candle on a stick



Procedure

1. Place a watch glass underneath the metal hydrogen rocket apparatus.
2. Carefully add about two spoonfuls of lycopodium powder to the watch glass.
3. Place finger over hole in the top of the rocket and insert the rubber hose into bottom of rocket.
4. Let the H_2 gas flow for 1-2 minutes to ensure the rocket fills with the gas. Be sure to hold the rocket upright while filling.
5. Place the rocket on the stand, light the hydrogen at the hole on the top of the rocket with the candle on the stick. Step back, dim the lights and cover your ears.
6. Wait approximately 30 seconds to 1 minute. When the flame disappears, a low whistling can be heard just before the gases explode loudly and the lycopodium powder ignites.

Additional Information

1. The reaction is

   $$2\ H_2(g) + O_2(g) \rightarrow H_2O(g)$$

2. The lycopodium powder is optional but adds greatly to the rocket effect.

Variation

This demonstration can be done using a Pringles can. A hole the size of a quarter should be cut in the center of the can lid. A small hole should be punched in the bottom of the can with a nail. Place the lid on the can, invert it, cover the small hole with your finger and fill the can with hydrogen gas. Place the can on a small iron ring on a ring stand. Ignite the hydrogen as above. The reaction takes about 100 seconds.

Safety

Never attempt to refill the hydrogen rocket with additional hydrogen once the top is lit.

Wear ear protection and light the rocket from a distance.

Disposal

Once the demo is complete, the lycopodium powder can be cleaned off the counter and reused for this demo.