Dust Explosion

Summary

Particles of lycopodium powder are ignited by a candle in an enclosed can, causing the lid to blow off!

Hazards

Big bang, big flame. Stand at a safe distance. Never blow out the candle with your breath!

Chemicals and Solutions

0.5 to 1.0 g lycopodium powder

Materials

- explosion can with a hole in the side near the bottom (the hole should be the same size as the rubber stopper attached to the bent glass funnel)
- candle
- pipet bulb
- tongs
- matches
- bent glass funnel fitted with a rubber stopper
- rubber tubing

Procedure

1. Bend the stem of a glass funnel to form a right angle and then slide on a one-hole rubber stopper.
2. Place the bent glass funnel inside the explosion can such that the rubber stopper fits snugly into the hole in the side of the can and the funnel itself is in an upright position.
3. Attach rubber tubing to the stem of the bent glass funnel.
4. At the other end of the tubing attach a pipet bulb.
5. Place the candle in the can such that the wick is approximately level with the funnel top.
6. Add lycopodium powder to the funnel.
7. Using tongs and a lighted match, light the candle.
8. Place the lid on firmly and evenly.
9. Quickly move away from the can and squeeze the bulb firmly. An explosion, accompanied by a flame, will blow the lid high in the air.

Hint: As an alternate procedure a “Jack-O-Lantern” can be carved from a pumpkin and used as the “explosion can”. You'll have a flame-throwing pumpkin.
Discussion

Lycopodium powder, the spores of a common moss, consists of very small particles that burn very rapidly when sprayed into a flame. The rate at which a solid reacts increases with increasing surface area. The very fine particles of lycopodium powder have a very large surface area for a given mass. Dust explosions have been known to happen in grain elevators.

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