

SCH 4U/4C1 LAB: SYNTHESIS OF ACETYLENE (ETHYNE) GAS

Did you know that acetylene burns when combined with oxygen?

In this lab we will examine the combustibility of acetylene and its possible applications.

Materials Required:

- 1 small to medium balloon
- 1 disposable dropper
- 4 mL distilled H₂O
- 2 g calcium carbide (CaC₂)
- 1 knitting needle
- 1 Bunsen burner
- safety goggles

Procedure:

1. Push **2 g CaC₂** through the neck of a **balloon**.
2. Measure **4 mL of water** into the graduated cylinder.
3. Cover top of graduated cylinder with neck of balloon.
4. Invert graduated cylinder and immediately pinch the neck of the balloon.
5. **Securely tie** and place balloon on the counter. **Record observations.**
6. When the reaction has ended, **puncture a small hole** in the *soft* part of the balloon.
7. Squeeze the balloon where the hole is located near a **lit** Bunsen burner. **Record observations.**

Discussion Questions

1. The carbide ion in calcium carbide has a triple bond, $[:C\equiv C:]^{2-}$
Write the chemical equation for the reaction, where CaC₂ is mixed with water.
2. Draw the structure of **acetylene**.
3. What suggestions can you give regarding the storage of calcium carbide?
4. From your observation of the reaction of the acetylene gas with the flame, write the balanced chemical equation for the complete combustion of acetylene.
5. Suggest some possible commercial uses for this gas.