

Liquid O₂

Purpose

To illustrate the paramagnetic properties of liquid oxygen and diamagnetic properties of liquid nitrogen.

Materials

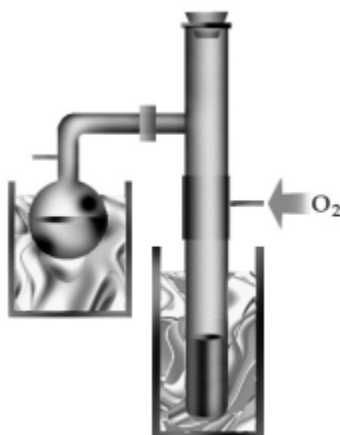
liquid O₂ generator
O₂ gas
strong magnet

liquid nitrogen
dewars for liquid N₂ baths

Procedure

Preparation – At least 3 hours are needed

1. Set up the liquid O₂ generator as illustrated below:



2. Place the apparatus in the hood and make sure that both the round bottom flask and the collecting tube are immersed in liquid N₂ (use dewars). This must be maintained throughout the collection process.
3. Attach tubing from the O₂ source to the O₂ generator as illustrated above.
4. Turn on O₂ and wait until enough liquid O₂ is collected. Turn off O₂.
5. Keep liquid O₂ immersed in liquid N₂ in dewar.

Presentation

1. Place the permanent magnet on the overhead projector (or in front of the video camera) so the pole gap shows on the screen.
2. Pour liquid N₂ into the pole gap.
3. Pour liquid O₂ into the pole gap showing the O₂ fills the pole gap and then boils away.

Additional Information

1. Show the blue color of liquid O₂ before the experiment.
2. Wear thermal gloves when handling the liquid O₂ in the test tube.
3. The permanent magnet is **very** strong. Be careful near magnetic strips (credit cards, etc.).

Question for the Students

1. Why does the O₂ stick between the poles and the N₂ does not?

Disposal

Liquid O₂ is dangerous and should be handled with care. Excess O₂ from this demonstration can be used for the Flaming Cheetos demo.

Reference

University of Illinois, Urbana-Champaign.