

Luminol Ammonia Fountain

We built this after watching a video we found on YouTube
“Don’t try this at home” doesn’t apply to the lab, right?

Chemicals and Equipment Needed

For Luminol

- Luminol:
 - Luminol – **prep lab fridge**
 - NaHCO_3 – **G1**
 - Na_2CO_3 – **G1**
 - $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ – **F1**
- Dilute H_2O_2 solution
 - 30% H_2O_2 – **K3**
- 2 L beaker - **Q1**
- Stir bar and plate– **U1/A4**
- 1 L graduated cylinder – **Q4**
- Dedicated Luminol and H_2O_2 bottles – **H5**

For Fountain

- Squeeze bottle of d- H_2O
- Cylinder of NH_3 – **hood**
- 2 L round bottom flask and cork ring – **Q5**
- Special stopper for round bottom flask – **P5**
 - With glass tubes, T-junction, and tygon tubing
- 2- 1 L Erlenmeyer flasks – **P1**
- 50 mL beaker – **P4/Z**
 - Contains pipet bulb and pipet bulb caps
- Tall ringstand – **J**
- Iron ring, covered in parafilm – **J2**

Preparation of Solutions

- **Luminol:**
 - Measure out the following:
 - 0.2 g luminol
 - 24.0 g NaHCO_3
 - 4.0 g Na_2CO_3
 - 0.4 g $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
 - Add all compounds (except NaHCO_3) to a mortar and pestle and grind, then transfer to a 2 L beaker. Add 800 mL d- H_2O and stir with a stirplate until dissolved. This may take 30 minutes. After the solids have dissolved, dilute to 1 L and pour into dedicated bottle. **DO NOT HEAT!**
- **H_2O_2 :**
 - Fill 1 L graduated cylinder with 500 mL d- H_2O . Measure out 5 mL 30% H_2O_2 , add to cylinder. Dilute to final volume of 1 L and pour into dedicated bottle.
- Test the solutions by mixing 100 mL of each in a beaker with the lights off.

Preparation of Demonstration

- **WARNING:** When the demo is done, the apparatus will be extremely top-heavy. Never ever ever try and move it with the now-full RBF in a high position. Remove it or lower the iron ring. You may break the flask and other glassware if you try and move the cart or apparatus without lowering the flask.
- Insert the special stopper into the neck of the flask and wrap parafilm around it to secure it. Set it on the cork ring in the hood. While wearing gloves, connect the hose from the NH_3 cylinder to the short glass tube in the stopper. Make sure to arrange the tygon tubing so that the gas flows away from you. Open the cylinder, then open the hand valve. Test for gas flow by holding a piece of pink litmus paper (or pH paper) at the opening of the tygon tubing; if it turns blue, gas is flowing.
- Allow gas to flow for 2 minutes, then close the hand valve. Close the cylinder, then reopen the hand valve to bleed out any remaining gas, and close again. Plug the end of the tygon tubing with the **P** pipet bulb caps, then remove the gas tube and plug the glass tube with the **G** pipet bulb cap.

- Set the flask on the cork ring next to the Erlenmeyer flasks.
- Use the squeeze bottle to fill the pipet bulb. Remove the other cap, and attach the bulb to the short glass tube. Be careful not to squirt water into the flask.
- On delivery: Turn the flask upside down and place it (neck down) in the iron ring. Pour the luminol solution into one Erlenmeyer flask, and the H_2O_2 into the other. Put one length of tubing in the luminol flask, the other into the H_2O_2 flask. You may need to arrange the tubing so that it is secure in the flask.
- Use the squeeze bottle to fill the pipet bulb. Remove the other cap, and attach the bulb to the short glass tube. Be careful not to squirt water into the flask.

Presentation

- Squeeze the bulb to force water into the flask. NH_3 should immediately begin dissolving in the water, which creates a partial vacuum. The water from the Erlenmeyer flasks will be pulled into the RBF, creating a fountain effect. The luminol and H_2O_2 solution combine at the T-junction, producing a glowing blue solution.
- The effect will continue until the pressure is equalized (the flask will be nearly full)

Clean-Up

- Lower the iron ring, and remove the pipet bulb, allowing the flask to drain as much as possible. Remove the flask from the iron ring, take out the stopper, and wash the whole assembly, using the air spigot in the hood to dry the glass and tygon tubing. The round bottom flask generally takes 1-2 days to dry; you can speed it up by running air through it, again from the spigot in the hood.
 - If you need to use it the same day, use acetone to speed up the drying
- All solutions can go down the sink with plenty of water

NOTES:

- For alternate presentations, see **Luminol** and **Ammonia Fountain**