

Glow in the Dark

Purpose

Illustrate a chemical change involving chemiluminescence.

Materials

- Sodium carbonate 10-hydrate, $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$
- Sodium bicarbonate, NaHCO_3
- Luminol (3-aminophthalhydrazide)
- Ammonium carbonate monohydrate, $(\text{NH}_4)_2\text{CO}_3 \cdot \text{H}_2\text{O}$
- Copper(II) sulfate 5-hydrate, $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
- (2) 1-L Erlenmeyer flasks
- (2) 400-mL glass beakers
- 100-mL graduated cylinder
- Electronic balance
- Deionized water

Safety

- Read the SDS sheets for all chemicals before using them.
- Wear safety glasses, gloves, and lab coat.
- Have an audience member remain by the light switch so no one has to move while the lights are dimmed.

Procedure

1. Add 500 mL of deionized water to a 1-L Erlenmeyer flask labeled "Solution A".
2. Add 10.7 g of sodium carbonate to Solution A. Stir.
3. Add 0.2 g of luminol to Solution A. Stir.
4. Add 24.0 g of sodium bicarbonate to Solution A. Stir.
5. Add 0.5 g of ammonium carbonate to Solution A. Stir.
6. Add 0.4 g of copper sulfate to Solution A. Stir.
7. Add deionized water to Solution a flask to a final volume of 1 L.
8. Add 950 mL of deionized water to a 1-L Erlenmeyer flask labeled "Solution B".
9. Add 50 mL of 3 % hydrogen peroxide to Solution B. Stir.
10. Pour equal volumes (~100 mL) of Solution A and B into separate beakers.
11. Dim the lights and then mix the solutions in the two beakers together.

Results

- Upon mixing, the resulting solution glows for several minutes.

Follow-up Teaching Notes

- The two solutions can be poured simultaneously down a clear spiral plastic tube for a more dramatic effect.

Concept

- Chemiluminescence.

Disposal/Clean-up

- The resulting solution can be placed in the science department's organic waste container for proper disposal by a licensed disposal company.