Luminol

Purpose

To demonstrate a chemical reaction that produces energy in the form of light.

Materials

ring stand / clamp

buret clamp

glass funnel

two 1000 mL flasks

coiled condenser

500 mL flask

sodium carbonate

luminol

ammonium carbonate anhydrous

3% H_2O_2 (store bought)

$CuSO_4 \bullet 5\ H_2O$

Solution A: To 500 mL of distilled water add:

4.0 grams of anhydrous sodium carbonate

0.2 grams of luminol

24 grams of sodium bicarbonate

0.42 grams anhydrous ammonium carbonate

0.4 grams cupric sulfate pentahydrate

Stir until all chemicals dissolve and add enough water to make one Liter.

Solution B: Add 50 mL of 3% hydrogen peroxide with enough distilled water to make one Liter. Note: Solution B should be made fresh

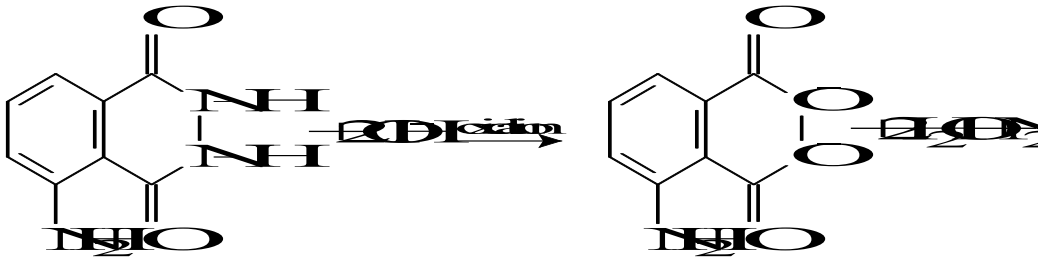
Procedure

1. Attach a coiled condenser to a rings stand above a 500 mL flask.
2. Secure a glass funnel so that it will pour into the condenser.
3. Turn off the lights and pour Solutions A and B simultaneously into the glass funnel.
4. Verify that the light produced is not accompanied by heat.

Additional Information

1. As a substitute for the coiled condenser, clamped tygon tubing coiled about a ring stand can be used.
2. Variation: wearing gloves, soak a piece of cotton in about 50 mL of Solution A. Immerse the cotton in about 50 mL of Solution B and wring out the cotton. In the dark the cotton ball will glow and "drip fire."

3. Luminol = 5-amino-2,3-dihydrophthalazine-1,4-diome.
4. The active ingredient (glowing) is the aminophthalate ion.
5. The chemiluminescent reaction of luminol oxidation is represented by:



Disposal

Solutions should be placed in proper waste container and labeled.

Reference

Shakharshiri, Bassam. Chemical Demonstrations, Volume I, 1983.