

University of Utah Chemistry Demonstration:

SAFETY

No unusual precautions need to be taken

Luminol

Reagents:

Solution 1:

4 g sodium carbonate (anhydrous) (Na_2CO_3)
Distilled H_2O
0.2 g luminol ($\text{C}_8\text{H}_7\text{O}_3\text{N}_3$)
24 g sodium bicarbonate (NaHCO_3)
0.5 g ammonium carbonate monohydrate ($(\text{NH}_4)_2\text{CO}_3 \cdot \text{H}_2\text{O}$)
0.4 g copper(II) sulfate pentahydrate ($\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$)

Solution 2:

Distilled H_2O
50 mL 3% H_2O_2

Preparation:

The prep for this experiment should be done before you leave the lab.

Solution 1:

- In a 1 L flask (or nalgene bottle), dissolve 4 g sodium carbonate in 500 mL H_2O
- Add 0.2 g luminol and stir to dissolve
- Add 24 g sodium bicarbonate, 0.5 g ammonium carbonate monohydrate, and 0.4 g copper(II) sulfate pentahydrate and stir until it dissolves.
- Dilute the final volume of the flask to 1 L with H_2O

Solution 2:

- In a separate 1 L flask (or nalgene bottle) add 50 mL 3% H_2O_2 and 1 L H_2O

Instructions:

Turn off the lights in the room. Set the luminol apparatus up and be sure to have the end of the tubing lay in at least a 2 L container. Simultaneously pour both solution 1 and 2 into the funnel.

Once you have finished running the luminol exp, run water through the apparatus.

Disposal: All solutions can be poured down the drain

This reaction is an oxidation-reduction experiment where light is produced. Using H_2O_2 as the oxidizing agent, luminol is oxidized producing its derivative, which is in an excited state. The luminol derivative is then reduced to a lower energy state, emitting energy in the process. Because there is not another compound to absorb this energy, light is released as the molecule returns to its ground state.

You can talk about how similar reactions are seen in glow sticks and lightning bugs.

