

Oxidation of Luminol

Action

When a solution containing Luminol is mixed with a dilute solution of hydrogen peroxide, an iridescent blue light is produced.

Grade Level

Grade 6 - Chemicals and Reactions

Grade 9 - Chemistry and You

Grade 10 - Life Science

Materials

- A 1000 ml beaker or flask

Luminol Solution

- 500 ml distilled water
- 2.0 g sodium carbonate
- 12.0 g sodium bicarbonate
- 0.25 g ammonium carbonate
- 0.2 g copper (II) sulfate pentahydrate
- 0.1 g luminol

Oxidizing Solution

- 25 ml of 3% hydrogen peroxide
- 500 ml distilled water

Instructions

- Measure the appropriate amounts of the dry chemicals for the luminol solution and dissolve them in the 500 ml of water.
- Prepare the oxidizing solution. You now have 2 solutions - one that is clear and colourless and one that is clear and light blue in colour.
- Dim the lights in the room so that it is dark, but so there is still enough light to see what you are doing.
- Pour the 2 solutions into the flask. An iridescent blue light will be emitted.

Safety

The chemicals used in this experiment should never be ingested. They can be disposed of down the sink with lots of water.

Hints

The students should observe that this is a chemical reaction. A gas is also released.

Science Principle

The oxidation-reduction reaction releases a photon of light from an excited molecule. This is an oxidation experiment where light is produced. The reaction oxidizes the luminol compound producing an amino phthalate derivative, which is in an excited state. The luminol derivative is then reduced to a lower energy state, emitting energy in the process. In the absence of another compound to absorb this energy, light is released as the molecule returns to the ground state.