

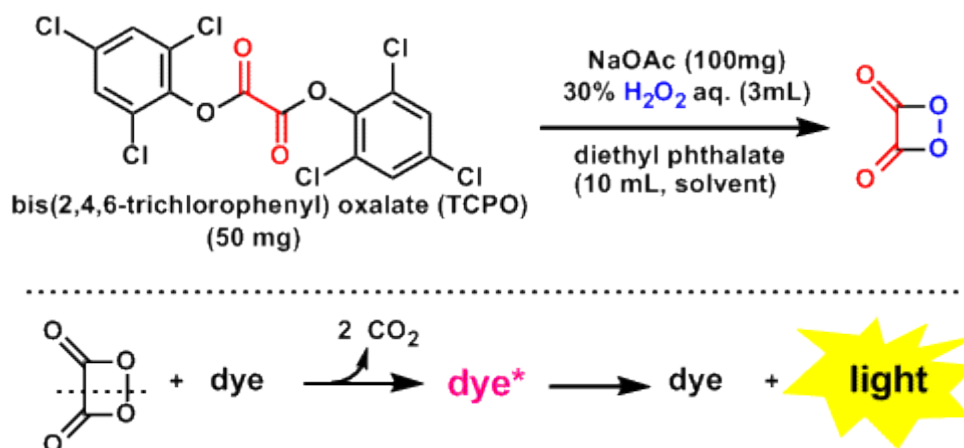
## B. Tech Chemistry Lab: Experiment 5

### Glow Stick Experiment through Organic Synthesis, and Chemiluminescence

**Introduction:** Chemiluminescence is the emission of light from a chemical reaction. Unlike fluorescence or phosphorescence, which require external energy sources like ultraviolet (UV) light to trigger the emission of light, chemiluminescence occurs naturally as a byproduct of certain chemical reactions.

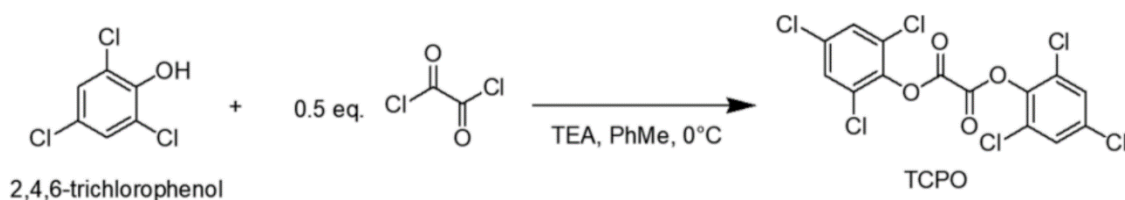
The light emitted is usually in the form of a glow, and the process can occur in various substances, including fireflies, certain types of glow sticks, and even in some biochemical reactions used in research.

In a typical Glow Stick Experiment, when TCPO (1,2,3,4-Tetrachloro-6,7-dimethoxyisoquinoline) comes into contact with hydrogen peroxide, it breaks down, forming a high-energy intermediate molecule that can then transfer its energy to a fluorescent compound (Diphenyl anthracene), causing it to emit light.



### Procedure:

#### Synthesis of TCPO:



1. Place a 20 mL Test tube on a stirrer with a magnetic bead inside. Add 500mg (1 equivalent) of **2,4,6-trichlorophenol**, cover with a septum, and purge with nitrogen gas.
2. Dissolve the trichlorophenol in **Dry Toluene** using a metallic needle. Add 0.35mL (1 equivalent) of **Triethylamine** and stir for 5 minutes under nitrogen conditions.

3. After stirring, add 0.1mL (0.5 equivalent) of **Oxalyl chloride** to the solution while in an ice bath. The solution will solidify.
4. Remove the flask from the stirrer, vacuum filter the solution, and wash the solid with **Methanol**. The product, **TCPO**, will be a white powder.

**Let it glow:**

1. **Chemiluminescent Solution:** Prepare a solution of **Sodium acetate (25mg)** and **Diphenyl anthracene (25mg)** (1:1) in **Diethyl phthalate (2ml)**.
2. Add 5 drops of **Hydrogen peroxide** to the solution. Add a small amount of synthesized **TCPO** to the chemiluminescent solution. A blue chemiluminescent glow will be observed (This part will be done once you are done with synthesis of TCPO and have the product).
3. Observe the glow (chemiluminescence) in the dark.