

## NATURE-SA-LESSON PLAN

### Introduction:

Light plays an important role in our day-to-day life. It has been a source of many processes, which we come across on a daily basis for eg, photosynthesis.

### Objective:

Today we will be doing experiments, which include

- I. Production of light through combining two reagents.
- II. Reversible oxidation –reduction reaction using light
- III. Chemical reactions/degradation using light.
- IV. Transfer of one chemical form to another using light

### Group Activity:

Students will work in groups of five to complete the experiments.

Light is produced when two reagents are added: the presenters will do the demonstration and the students will note down their observation

### Glow stick experiment:

#### Chemicals required:

- 10mL Diethyl Phthalate (solvent)
  - 3mg of fluorescent dye
  - 50mg TCPO (Bis(2,4,6-trichlorophenyl) Oxalate
  - 100mg sodium acetate
  - 3mL 30% hydrogen peroxide
- (All the quantities are approximate)

#### Materials required:

- 15 mL glass vials
- Gloves

#### Procedure:

Take 10 mL of diethyl phthalate in a glass vial (vial-1); add 3 mg of dye followed by the addition of TCPO and sodium acetate. Close the vial-1 and shake it. Take hydrogen peroxide in another glass vial (vial-2). Turn off the lights and then transfer the vial 1 solution to vial 2.

Note down your observation in table 1.

Repeat the experiment using a different dye.

Table 1:

Group No. :		
S. No.	Dye	Observation

### Principle:

Chemiluminescence: It is the emission of light during the course of chemical reaction.

### Reversible oxidation-reduction photoreaction:

#### Chemicals required:

- 3 mL 0.01 M NaOH solution
- 3 mL of 0.5 M triethanolamine
- 1 drop of methylene blue in water

#### Materials required:

- 1 Compact fluorescent lamp(CFL)
- Gloves
- 10mL glass vial

#### Procedure:

To 3 mL of NaOH solution in a glass vial, add 3 mL of triethanolamine solution followed by the addition of 1 drop of methylene blue. Close the vial and shake it. Note down the color of the solution in the vial. Place it near the compact fluorescent lamp (CFL). After 5 minutes turn off the lamp. Note down the color of the solution. Shake the vial 10 times. Note down your observation

What happens to the solution when you add methylene blue?

What happens to the color after keeping it near the CFL?

What happens to the color after shaking the vial for 10 times? Do you see any difference?

### Degradation with Light:

#### Chemicals required:

- 2 mg of polymer/oligomer
- 2 mL THF : water mixture(4:1) (solvent)

#### Materials required:

- 5 mL glass test tube
- Gloves
- Aluminum foil

### Procedure:

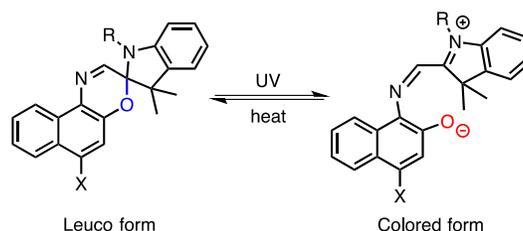
Take 2 mg of polymer/oligomer in a glass vial; add 2 mL THF: Water mixture. Close the vial. Place the test tube under sunlight. Note down your observation up to 45 min table 2

Table 2

Group No. :		
S. No.	Time (min)	Observation
1.	15	
2.	30	
3.	45	

### Transfer of one chemical form to another using light:

Photochromic glasses: They are materials which when exposed to outdoor light changes the form which is colored. When it is indoor it will retain its form, which is not colored.



### More fun with light:

- ✓ What happens when Vaseline (petroleum jelly) is observed under black light???

### Materials required:

- Vaseline
- A black light
- Petroleum jelly
- Black lid or black surface.

### What is Black Light?

It is called black light because it gives off very little light that our eyes can see. Visible light contains a spectrum of colors ranging from red, through orange, yellow, green, and blue, to violet or purple. Beyond violet light in the spectrum is ultraviolet light, which our eyes cannot detect.

Procedure:

Wear gloves, take Vaseline and draw shapes or write any message on the black surface. Turn off the light and turn on the black light.

What do you see when the black light is turned on?

Do you see any difference when the message is observed under household lamp and under black lamp?

What is causing the difference?

Can you think of any other examples, which you have come across?