

National Chemistry Week 2024

Glow Stick Magic: The Science of Light!

Materials (For each individual demonstrator and student)

For each vial

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|----------------------------|--------------------|
| 1) Diethyl Phthalate (DP) | 2.5 mL |
| 2) Fluorescent Dye | ½ small spatula |
| 3) TCPO | 2 small spatula |
| 4) Sodium acetate | 1 small spatula |
| 5) Hydrogen Peroxide (30%) | 1.5 ml |
| 6) Vials with caps | 1 |
| 7) Glow sticks | 1 for each student |

*Out of the five ingredients (DP,Dye,TCPO, Sodium acetate and H_2O_2) all the four ingredients are already mixed by us. At school, you just need to add H_2O_2 .

Preparation Instructions for Demonstrators:

Lay out 1 vial on the table.

Start Here

Demonstrator: Hey, everyone! Are you ready for some glowing fun? Welcome to National Chemistry Week! This year's theme is **"Picture Perfect Chemistry"**, and we're going to dive into the chemistry behind glow sticks, just like how photographs rely on light and chemistry to capture images. Today, we're making our very own glow sticks from scratch! Who's excited to see some glow-in-the-dark magic?



National Chemistry Week 2024

Demonstrator: Alright, before we start, remember that even though we're going to have fun, safety comes first! We need to be careful with the materials. These chemicals are like the ingredients in a recipe—you wouldn't want to spill your milk while baking, right? Same here! So let's be careful, follow the steps closely, and keep everything tidy. Ready to make some glowing magic?

Demonstrator: So, glow sticks start with a special liquid. This liquid is like water but it's called diethyl phthalate—but we can call it "the glow stick juice" because it makes everything glow brighter! This liquid holds all the ingredients together.

[Pour about 2.5 ml of the liquid (DP) into a glass vial].

Demonstrator: Next, we need some color! What's your favorite color? [Waits for kids to shout out colors.] Great! We can make glow sticks in colors like green, blue, and red. But for that, we need special glow dyes.

[Holds up small vials of dyes.]

9,10-bis(phenylethynyl)anthracene for **green**

9,10-diphenylanthracene for blue

Thioflavin T for green.

[Add ½ small spatula of the fluorescent dye to the liquid in the vial.]

Demonstrator: Now, here's where the magic happens! To make the glow stick actually glow, we need to add something called TCPO and sodium acetate, you can think of these as the glow makers. When it mixes with our glow juice and dye, it gets things glowing!

[Add 2 small spatula TCPO powder and 1 small spatula of sodium acetate.]

Demonstrator: But wait—we still need one more thing to make it light up! You know how you crack a glow stick to make it glow? That's because there's something called hydrogen peroxide inside that gets the glow going. When I add this, we'll see the glow happen right before our eyes!



National Chemistry Week 2024

[Add 1.5 ml 30% hydrogen peroxide, close the cap of the vial very tightly, shake the container, and dim the lights.]

Demonstrator: Whoa! Look at that glow! Isn't it amazing? *[Show the glowing container. If you keep shaking for a longer time, you get better glow.]*

Demonstrator: So how does this all work? When we added the hydrogen peroxide, it mixed with the other ingredients and started a chemical reaction—that's just a fancy way of saying the ingredients are working together to make light! We were able to make light from chemicals.

Demonstrator: And there you have it, everyone! We just made our own glow sticks using chemistry. Isn't science awesome? You can see how this connects to photography because both use light and chemistry to create something cool. Next time you crack a glow stick or take a picture, remember—it's all chemistry working behind the scenes!

