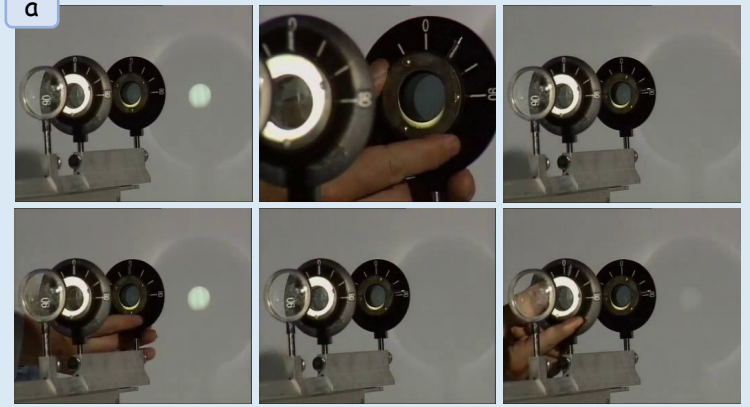
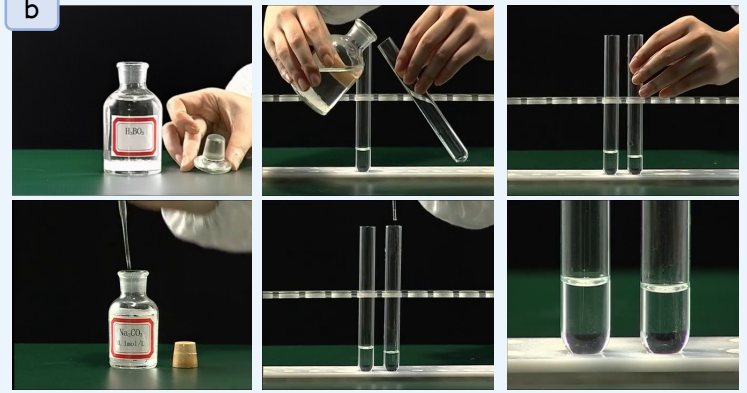
## Experiment Videos

a



b



## Passages

**[REL]** Polarization spectroscopy comprises techniques based on polarization properties of ligh (not necessarily visible one)... By analyzing these properties, decisions can be made about the media the light passes through.

**[NOT REL]** Polarization mode dispersion (PMD) is a form of modal dispersion where two different polarizations of light in a waveguide, which normally travel at the same speed, travel at different speeds...

**[REL]** Under the same conditions, acetic acid reacts readily with sodium carbonate at room temperature... Boric acid reacts much more slowly with sodium carbonate and typically requires heating to proceed... This is due to its weaker acidity and lower reactivity in aqueous solution.

**[NOT REL]** React with water to form a base; or react with an acid to form a salt and water which are called neutralization reactions.

## Commentaries

**Qwen2.5-VL-7B**: <Procedure> When the incident light is parallel. The light transmitted through both polarizers becomes polarized.

**GPT-4o**: <Procedure> Rotate the second polarizer slowly, keeping an eye on the light spot on the screen. You'll notice that as you twist the polarizer, the brightness of the spot changes, eventually reaching a point where the light is completely extinguished. <Principle> This process demonstrates the principle of light polarization. When the polarization directions of the two polarizers are perpendicular, all light is blocked due to the inability of light waves to pass through both filters. This specific alignment is referred to as cross-polarization, and it highlights how polarizers can control light.

**ExpStar**: <Procedure> Rotating either polarizer. We can observe changes in the transmitted light intensity. <Principle> The polarizing effect of polarizers verifies light's transverse wave nature. Rotation alters the direction of the transmission axis, causing cosine-squared variation in light intensity.

**Qwen2.5-VL-7B**: <Procedure> Take a small amount of boric acid solution in a tube. Add sodium carbonate solution dropwise. <Principle> $H_3BO_3$ is a weak acid with lower acidity than acetic one. It reacts with sodium carbonate to form sodium borate ($NaB(OH)_4$).

**GPT-4o**: <Procedure> Now, carefully transfer a small amount of boric acid solution into a clean test tube. Slowly add sodium carbonate solution dropwise to the test tube containing the boric acid solution. Observe the test tube closely for the presence or absence of bubbles, noting the comparative intensity and duration of any gas production during the reaction of boric acid with sodium carbonate. <Principle> We are repeating the reaction conditions used for acetic acid to observe the reaction <Safety> Ensure that you are working in a well-ventilated area and wearing appropriate safety gear.

**ExpStar**: <Procedure> Add boric acid solution to another test tube.Add sodium carbonate solution dropwise. <Principle> $H_3BO_3 + Na_2CO_3 \rightarrow NaH_2BO_3 + NaHCO_3$ <Safety> Avoid direct contact between boric acid solution and skin or eyes.