

Tyndall Effect Activity

Adapted by Dr. Andrew Greenberg from B.Z. Shakhshiri, *Chemical Demonstrations Volume 3*, University of Wisconsin Press (1989).

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Purpose: The goal of the lab activity is to teach students how to use the Submersible Audible Light Sensor to distinguish changes in turbidity of a colloidal sulfur solution.

Learning Objectives:

1. Learn how to operate the SALS sensor
2. Learn how to make colloidal sulfur
3. Learn to distinguish turbidity of a solution using the SALS sensor.

Materials:

- 400 ml 10% Sodium Thiosulfate ($\text{Na}_2\text{S}_2\text{O}_3$)
- 10 ml of 1M HCl
- 1 600 ml Beaker
- 1 stirring rod
- 1 SALS sensor
- 1 roll of clear plastic wrap
- 1 light box



Procedure:

1. Add 400 ml of sodium thiosulfate to the beaker
2. Cover your light box with a coat of plastic wrap.
3. Place the beaker on top of the light box and turn on the light.
4. Turn SALS Device on using the power button. (see attached diagram of Device).
5. Place the sensor of the SALS device inside beaker
6. Push the Play button to hear the tone this color and note the starting color of the solution.
7. Store the tone in the memory by hitting the Store button and then Memory 1. This allows you to compare this tone to the tones of the next concentrations. (Careful...there is also a Memory 2 so don't get confused)
***BE SURE TO REMEMBER TO STORE TONE IN MEMORY AND WHICH MEMORY IT IS IN!)

8. Add a few drops of HCl to the beaker using a plastic pipet.
9. Stir the solution with the stirring rod.
10. Press the Play button and note the tone of the output. You should hear a change in the tone. This represents a change in turbidity of the solution.
11. When the tone stabilizes store this tone in the memory by hitting the Store button and then *Memory 2*.
***BE SURE TO REMEMBER TO STORE TONE IN MEMORY AND WHICH MEMORY IT IS IN!
12. Compare the tone of this pH with the first pH stored in Memory 1.
13. Repeat steps 8 to 12 each time replace the tone in Memory 2.
14. Stop adding HCl when after stirring the tone no longer changes.
15. The tone in Memory 1 represents a clear colorless solution and the tone in Memory 2 a cloudy solution of colloidal sulfur.