

Dry Ice and Universal Indicator

Instructions

Materials:

Large beaker filled with water
Universal Indicator*
0.1 M NaOH (sodium hydroxide)
Dry ice

*Universal indicator can be ordered from sources such as Carolina Biological Supply Company or Flinn Scientific. You can order a 100mL bottle for less than \$10.00.

Set Up:

1. Add 5.0 mL of Universal indicator to a large beaker of water
2. Add 1-2 mL of 0.1 M NaOH to the water to form a basic solution.
3. Add 2-3 mL of red cabbage juice indicator to the basic solution. You should observe a dark blue color when the indicator is mixed with the solution.

Demo Procedure:

- 1 Point out to the students that in a neutral solution, the universal indicator turns the water a dark green color (pH 7).
- 2 When NaOH is added the solution is basic and the color turns dark blue instantly.
- 3 Drop dry ice into the basic solution.
- 4 Observe the rigorous bubbling of the carbon dioxide gas and the gradual change in the color of the solution from blue to green to yellow as the pH of the solution drops from basic to neutral to acidic.
- 5 When extra dry ice is added the solution becomes even more acidic and the solution turns slightly red.

Waste Disposal:

The final solution can be poured down the drain safely.

Variations:

- Pour some of the original solution into a 2nd beaker to act as a color control. The color change is more obvious when you compare the original color to the final solution color.