

# Dissolution of Ionic Compounds – Ornament Crystallization Lab

Do not write on this paper: We've been studying properties of ionic compounds. One of the properties is that ionic compounds are soluble in water. This means they dissolve in water. When ionic compounds dissolve the ions split apart.

In a solution, a solvent (water) can only hold a certain amount of solute. This is called the solubility of a solution. When the temperature of the solution is increased, hot water can dissolve more solid substance than cold water. This is because heated water molecules move farther apart, making room for more solid substance to dissolve. When no more of the solid substance can be dissolved, the solution is said to be saturated. As this solution cools, the water molecules move closer together again and there's less room for the solution to hold onto as much of the dissolved solid.

Crystals begin to form and build on one another as the water lets go of the excess solute. This process is called recrystallization. As the solute (ionic compound) is pushed out of solution it reforms its ionic bonds and creates crystals.

In this lab, we will be creating a saturated solution of the ionic compound  $\text{Na}_2\text{B}_4\text{O}_7$ , sodium borate (commonly known as Borax).

## **Procedure:**

1. In pairs, get a 1000mL Erlenmeyer flask and red tray from your instructor.
2. Add 18 spoonfuls of borax powder to your flask, then add about 800 to 850 mL of water.
3. Set up a Bunsen burner. Your ring clamp needs to be about 2 – 3 inches above the top of the Bunsen burner.
4. Heat the solution until all of the borax dissolves (it will still be a bit cloudy, but translucent). Stir gently every few minutes with a glass stir rod. Use the orange hot hands to hold the glassware while you stir, so the flask is not accidentally knocked over while stirring.
5. While the solution is heating, each student needs to obtain a 400mL beaker, one pipe-cleaner, a hanging hook (or yarn), and a wooden stick.
6. Bend the pipe-cleaner into a design and attach it to the hook. Lay the wooden stick over the 400mL beaker and hang your pipe-cleaner design from it. It must be able to hang inside the beaker **WITHOUT TOUCHING THE SIDES OR THE BOTTOM.**
7. Place the beaker with ornament on the red tray.
8. Once the borax has completely dissolved in solution, turn off the flame.
9. Using two pair of hot hands, remove your solution from the flame, and carefully put on a red tray.
10. Using the hot hands pour the solution into your beaker.
11. Let crystals grow for about 4 hours (or over night).

