

Solubility and Solutions— Demonstration Summaries and Concepts



Aloha Chemical Sunset—Colloids and Light Scattering

Watch as the sun sets over a chemical reaction! The reaction of sodium thiosulfate with hydrochloric acid produces elemental sulfur, which precipitates from solution to form a colloidal mixture. When the reaction is carried out on an overhead projector, the light from the projector is scattered by the colloidal sulfur particles and produces a multicolored chemical “sunset.”

Solutions, Colloids, and Suspensions—Principles and Properties

Solutions, colloids, and suspensions are defined and distinguished from one another based on the size characteristics of the dispersed particles. Are the particles large enough that they will settle upon standing or be trapped by a filter? Are the particles small enough that they will pass through a semipermeable membrane? What size particles will scatter light that is passed through the mixture? Learn all about the principles and properties of mixtures using this comprehensive demonstration.

Alka-Seltzer® and Gas Solubility—Effect of Temperature

Our students’ understanding of chemical principles is shaped by what they see or feel in the real world. For the effect of temperature on solubility, students often will generalize from their everyday experiences preparing food and beverages and conclude that substances are more soluble at higher temperatures. In the case of gases, however, this generalization is always wrong! Let’s see what an Alka-Seltzer tablet can teach us about the effect of temperature on the solubility of a gas.

Sorting Out Solutions—Hydrogen Bonding Demonstration

The total is not always equal to the sum of the parts! Use this two-part demonstration to highlight the effect of hydrogen bonding and other intermolecular forces on the properties of solutions. If you mix 50 mL of glycerol and 50 mL of water, the volume of the resulting solution should be 100 mL, right? Wrong! Although water and many alcohols are miscible, their solutions have a smaller volume than the original liquids. Add an ionic solute to an alcohol solution, however, and watch as the solution separates itself into two layers.

Instant Hand Warmers—Supersaturated and Saturated Solutions

Instant heat—any place, any time! Instant hand warmers contain a supersaturated solution of sodium acetate. A supersaturated solution is inherently an unstable (non-equilibrium) condition. When the solution is “stressed,” the dissolved solute seems to come crashing out of solution, releasing lots of heat in the process. The mixture gets so hot, it “freezes”! Use this discrepant event demonstration to teach your students about solubility, crystallization, and heats of solution.

Concepts

- Colloid
- Light scattering
- Tyndall effect
- Solution
- Colloid
- Light scattering
- Semipermeable membrane
- Gas solubility
- Reversible reactions
- Thermal pollution
- Miscible liquids
- Hydrogen bonding
- Salting-out
- Saturated solution
- Supersaturated solution
- Crystallization
- Exothermic reaction