

Factors Affecting Dissolving Rate

I. Solid Solutes

- A. Stirring-brings more fresh solvent into contact with more solute.
- B. Grinding the solute into smaller size particles. Smaller particles have more surface area than larger size particles. Since dissolving occurs at the surface of the solute, this allows more solvent to come in contact with more solute.
- C. Increase the temperature-this speeds up the particles and increases the rate of contact between solvent and solute particles.
- D-Generally, as temperature increases, the solubility of solids also increases and vice versa.

II-For Gaseous Solutes there are some differences.

A-Teacher Demo: draw and label the appearance of a beaker of hot tap water.

1-What do you observe?

a-The beaker of hot tap water starts off looking cloudy but soon begins to clear from the bottom of the beaker to the top.

2-What is the cloudiness composed of and why don't you see it in cold water?

a-The cloudiness is bubbles of gas that rise to the top of the beaker.

b-You don't see it in cold water because cold water keeps the gas dissolved ... until it warms to room temperature, and then you see bubbles stuck to the insides of the beaker.

B-This suggests that gases are more soluble in cold water and vice versa.

C-Pressure is also a factor for gas solubility in a liquid solvent such as water.

1-And unopened bottle of soda pop feels firm due to the high pressure inside and contains a lot of gas dissolved in the soda pop. If you remove the cap from the bottle you suddenly see bubbles of gas appearing in the soda pop. When you remove the cap the pressure on the solution of soda pop decreases and the gas that was dissolved in it, no longer can stay dissolved and comes out of solution.

D-So as pressure on a solution of gas and liquid increases, the solubility of the gas also increases and vice versa.

E-Stirring or shaking soda pop will decrease the solubility of gas in the liquid and will cause bubbles of gas to come out of solution.

III-Some practical applications of this information are as follows.

A-Tropical fish owners must keep the water from getting too warm or the fish will die from lack of oxygen, due to a decrease in the solubility of gas as temperature rises.

B-In the summer, many fish are in deeper water, since colder water can contain a higher amount of dissolved oxygen than warmer water can that is near the surface.

C-Fish brought to the surface from deep ocean waters often burst or split open due to a drop in water pressure as they near the surface.

D-Scuba divers that come up too quickly may get the " bends ", a condition caused by dissolved gases in the bloodstream coming out of the blood due to a drop in pressure as the diver ascends to the surface.