

## Chemistry Chapter 15

1. **Boiling Point Elevation:** the temperature difference between a solution's boiling point and a pure solvent's boiling point.
2. **Brownian Motion:** the jerky, random, rapid movements of colloid particles that results from collisions of particles of the dispersion medium with the dispersed particles.
3. **Colligative Property:** a physical property of a solution that depends on the number, but not the identity, of the dissolved solute particles; example properties include vapor pressure lowering, boiling point elevation, osmotic pressure, and freezing point depression.
4. **Colloid:** heterogeneous mixture containing particles larger than solution particles but smaller than suspension particles that are categorized according to the phases of their dispersed particles and dispersing mediums.
5. **Concentration:** a quantitative measure of the amount of solute in a given amount of solvent or solution.
6. **Freezing Point Depression:** the difference in temperature between a solution's freezing point and the freezing point of its pure solvent.
7. **Heat of Solution:** the overall energy change that occurs during the solution formation process.
8. **Henry's Law:** states that at a given temperature, the solubility of a gas in a liquid is directly proportional to the pressure of the gas above the liquid.
9. **Immiscible:** describes two liquids that can be mixed together but separate shortly after you cease mixing them.
10. **Insoluble:** describes a substance that cannot be dissolved in a given solvent.
11. **Miscible:** describes two liquids that are soluble in each other.
12. **Molality:** the ratio of the number of moles of solute dissolved in one kilogram of solvent; also known as molal concentration.
13. **Molarity:** the number of moles of solute dissolved per liter of solution; also known as molar concentration.
14. **Mole Fraction:** the ratio of the number of moles of solute in solution to the total number of moles of solute and solvent.
15. **Osmosis:** the diffusion of solvent particles across a semi-permeable membrane from an area of higher solvent concentration to an area of lower solvent concentration.
16. **Osmotic Pressure:** the additional pressure needed to reverse osmosis.
17. **Saturated Solution:** contains the maximum amount of dissolved solute for a given amount of solvent at a specific temperature and pressure.
18. **Solubility:** the maximum amount of solute that will dissolve in a given amount of solvent at a specific temperature and pressure.
19. **Soluble:** describes a substance that can be dissolved in a given solvent.
20. **Solvation:** the process of surrounding solute particles with solvent particles to form a solution; occurs only where and when the solute and solvent particles come in contact with each other.
21. **Supersaturated Solution:** contains more dissolved solute than a saturated solution at the same temperature.

- 22. Suspension:** a type of heterogeneous mixture whose particles settle out over time and can be separated from the mixture by filtration.
- 23. Tyndall Effect:** the scattering of light by colloidal particles.
- 24. Unsaturated Solution:** contains less dissolved solute for a given temperature and pressure than a saturated solution; has further capacity to hold more solute.
- 25. Vapor Pressure Lowering:** the lowering of vapor pressure of a solvent by the addition of a nonvolatile solute to the solvent.

### Key Equations

**Henry's Law:**  $\frac{S_1}{P_1} = \frac{S_2}{P_2}$  page 460

**Percent by Mass:**  $\frac{\text{Mass of solute}}{\text{Mass of solution}} \times 100$  page 463

**Percent by Volume:**  $\frac{\text{Volume of solute}}{\text{Volume of solution}} \times 100$  page 464

**Molarity:**  $\frac{\text{Moles of solute}}{\text{Liters of solution}}$  page 464

**Molarity-Volume Relationship:**  $M_1V_1 = M_2V_2$  page 467

**Molality (m):**  $\frac{\text{Moles of solute}}{\text{Kilogram of solvent}}$  page 469

**Mole Fractions:**  $X_A = \frac{n_A}{n_A + n_B}$        $X_B = \frac{n_B}{n_A + n_B}$  page 470

**Boiling Point Elevation:**  $\Delta T_b = K_b m$  page 472

**Freezing Point Depression:**  $\Delta T_f = K_f m$  page 473