Chemistry 20

Unit C: Solutions and acid-base chemistry

Electrolytes and solubility

One lamp on, one lamp dim

- Aqueous sodium chloride closes a conductivity circuit and the lamp glows.
- Aqueous sucrose, table sugar in water, leaves that same lamp dim.

Electrolytes and saturation

- An electrolyte produces mobile ions and the solution conducts. A nonelectrolyte such as sugar stays as whole molecules.
- Solubility is a maximum at a stated temperature, and a saturated solution keeps that maximum by equal rates.

Key terms

electrolyte

A substance that produces mobile ions in solution so the solution conducts electricity. (NaCl(aq))

nonelectrolyte

A substance that dissolves as whole molecules, so the solution conducts poorly. (sucrose(aq))

solubility

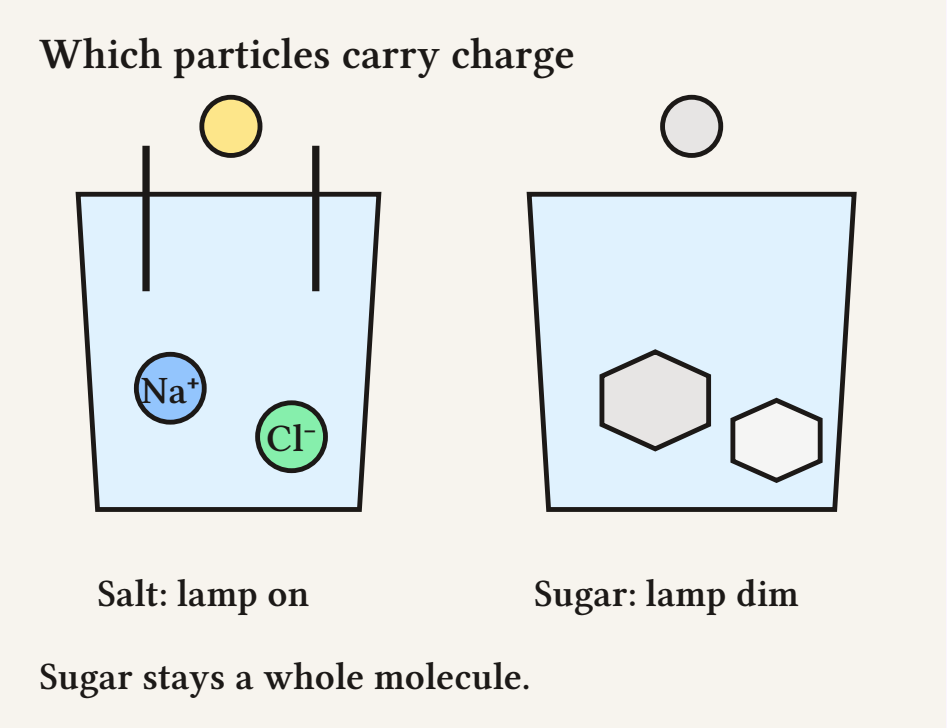
The maximum amount of solute that dissolves in a stated amount of solvent at a stated temperature. (g per 100 g water at 20 °C)

saturated solution

A solution in which dissolving and crystallization continue at equal rates, so the concentration stays steady. (solid still present)

Charge that can travel

- Sodium ions and chloride ions move through water and carry charge to the probes.
- Sucrose molecules spread through water and remain uncharged, so the current stays tiny.



Equal rates, steady dissolved amount

- In a saturated solution, undissolved solid remains in contact with the dissolved solute.
- The dissolving count and the crystallization count match, so the concentration holds steady.

Factors that affect solubility

- Many solids become more soluble in warmer solvent, and gases become less soluble in warmer solvent.
- Gas solubility rises when the gas pressure rises. Ethanol and water mix in all proportions, and oil and water form two layers.

Lamp and limit

- Explain the lamp in aqueous calcium chloride and in aqueous glucose.
- State what equal leave and return rates do to concentration, and what warming does to dissolved oxygen.