Aqueous Solutions

Solute dissolves in **Solvent**

Substance being dissolved

Substance doing the dissolving

↓

Solution

2 or more substances in a single phase

Soluble – Ability for a substance to be dissolved dissolved

1

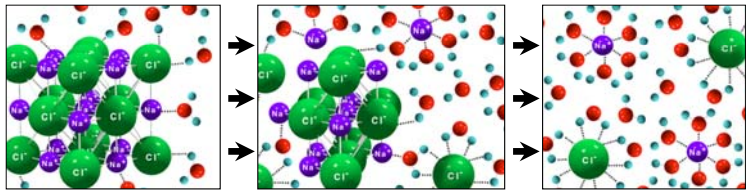
Dissociation Reactions

Dissociation

When an ionic compound dissolves, the ions will separate.

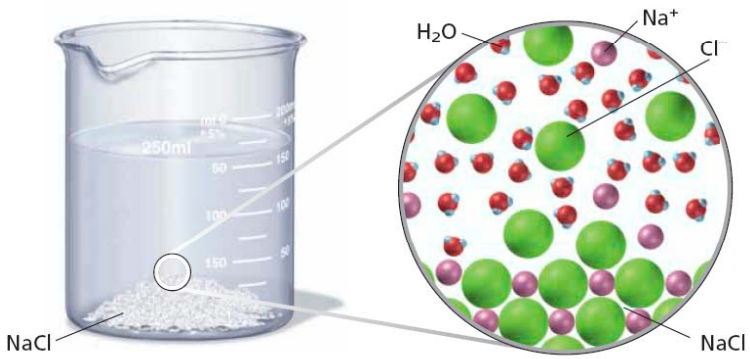
- Many ionic compounds dissolve in water
- Ions separate and are surrounded by water
- Attraction of water must overcome attraction between ions

$$NaCl(s) \xrightarrow{H_2O} Na^+(aq) + Cl^-(aq)$$



2

Dissociation of NaCl



3

Disassociation Reactions

Ionic compounds break up into individual ions

$$NaCl(s) \xrightarrow{H_2O} \underbrace{Na^+(aq) + Cl^-(aq)}_{\text{2 moles of ions}}$$

$$CaCl_2(s) \xrightarrow{H_2O} \underbrace{Ca^{2+}(aq) + 2\ Cl^-(aq)}_{\text{3 moles of ions}}$$

$$Ca(NO_3)_2(s) \xrightarrow{H_2O} \underbrace{Ca^{2+}(aq) + 2\ NO_3^-(aq)}_{\text{3 moles of ions}}$$

4

Disassociation Reactions

Provide the dissociation reaction and the number of total ions

$$AlCl_3(s) \xrightarrow{H_2O} \underbrace{Al^{3+}(aq) + 3\ Cl^-(aq)}_{\text{4 moles of ions}}$$

$$Fe_2(SO_4)_3(s) \xrightarrow{H_2O} \underbrace{2\ Fe^{3+}(aq) + 3\ SO_4^{2-}(aq)}_{\text{5 moles of ions}}$$

$$(NH_4)_3PO_4(s) \xrightarrow{H_2O} \underbrace{3\ NH_4^+(aq) + PO_4^-(aq)}_{\text{4 moles of ions}}$$

5

Electrolytes and Nonelectrolytes

Electrolyte – a substance in solution that conducts electricity

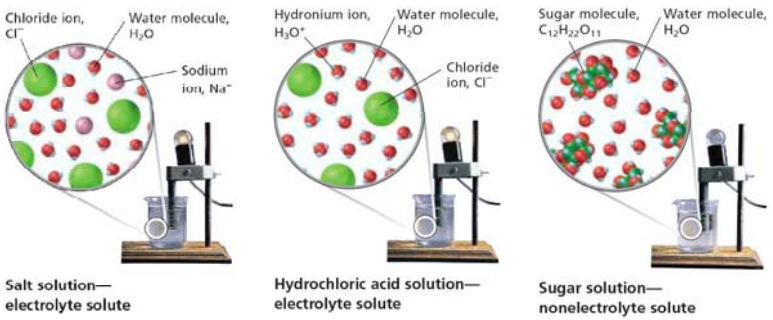
- Ionic compounds dissolve by forming charged ions that carry charge
- Acids can dissolve into ions that carry charge
- Example: NaCl and HCl

Nonelectrolyte – a substance in solution that does not conduct electricity

- Molecules that dissolve do not form charged particles to carry charge
- Example: Sugar

6

Electrolytes and Nonelectrolytes



- Ionic compounds dissolved in water will allow ions to move freely and conduct electricity
- Molecules are neutral and do not conduct

7