Aqueous Solutions

**Solute**  
Substance being dissolved

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**Solvent**  
Substance doing the dissolving

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**Solution**  
2 or more substances in a single phase

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**Soluble** – Ability for a substance to be dissolved

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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

\[ \text{NaCl(s)} \xrightarrow{\text{H}_2\text{O}} \text{Na}^{+}(aq) + \text{Cl}^{-}(aq) \]

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Disassociation Reactions

Ionic compounds break up into individual ions

\[ \text{NaCl(s)} \xrightarrow{\text{H}_2\text{O}} \text{Na}^{+}(aq) + \text{Cl}^{-}(aq) \]

2 moles of ions

\[ \text{CaCl}_2(s) \xrightarrow{\text{H}_2\text{O}} \text{Ca}^{2+}(aq) + 2 \text{Cl}^{-}(aq) \]

3 moles of ions

\[ \text{Ca(NO}_3)_2(s) \xrightarrow{\text{H}_2\text{O}} \text{Ca}^{2+}(aq) + 2 \text{NO}_3^{-}(aq) \]

3 moles of ions
Disassociation Reactions

Provide the dissociation reaction and the number of total ions

\[
\text{AlCl}_3(s) \rightarrow \text{Al}^{3+}(aq) + 3 \text{Cl}^-(aq)
\]

4 moles of ions

\[
\text{Fe}_2(\text{SO}_4)_3(s) \rightarrow 2 \text{Fe}^{3+}(aq) + 3 \text{SO}_4^{2-}(aq)
\]

5 moles of ions

\[
(\text{NH}_4)_3\text{PO}_4(s) \rightarrow 3 \text{NH}_4^+(aq) + \text{PO}_4^{3-}(aq)
\]

4 moles of ions

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

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