Chemistry 2.7
Redox Chemistry

Species in solution

Ionic solution

- As mentioned in Chemistry 2.4, when a ionic substance dissolves, the ions (cations and anions) will be separated by water molecules
- Once the ions are separated, they act independently as individuals.
- These independent chemicals are called **species**.

Examples

- When copper (II) sulfate $CuSO_4$ dissolves in water

$$CuSO_4(s) \rightarrow Cu^{2+} + SO_4^{2-}$$

  - The species in this solution are Cu^{2+} and SO_4^{2-}
- When potassium permanganate $KMnO_4$ dissolves in water

$$KMnO_4\ (s) \rightarrow K^{+} + MnO_4^{-}$$

  - The species in this solution are K^{+} and MnO_4^{-}

Spectator ions

- The ions that do not involve in chemical reactions are called **spectator ions**
- Common spectator ions are
  - **Cation** – K^+ and Na^+
  - **Anion** – SO_4^{2-} and NO_3^-
- The ions that involve in chemical reactions are called **active species**
- Only active species are needed for ½ equations

Examples

- **Potassium permanganate $KMnO_4$**
  - Potassium (K^+) is the spectator species
  - Permanganate (MnO_4^-) is the active species
- **Copper sulfate $CuSO_4$**
  - Sulfate (SO_4^{2-}) is the spectator species
  - Copper (Cu^{2+}) is the active species
- **Sulfuric acid H_2SO_4**
  - Sulfate (SO_4^{2-}) is the spectator species
  - Hydrogen ion (H^+) is the active species