

LESSON NOTES

Year/Level: 11 C/D

Week 12

Subject: Chemistry

Strand	3 Reactions
Sub Strand	3.2 types of reactions
Content Learning Outcome	Distinguish and describe different types of reactions based on chemical statements and balanced chemical equations

OXIDATION-REDUCTION

- Oxidation is the gain of oxygen, so combustion and corrosion reactions are oxidation reactions. Reduction is the loss of oxygen
- Oxidation and reduction reactions occur simultaneously. As a substance is reduced the other reactant will be oxidized
- An **oxidizing agent** gets **reduced** and **reducing agent** gets **oxidised**

Example 1:

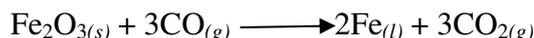
In the extraction of metal from metal oxides using carbon, the metal oxide is reduced to the metal and carbon is oxidised to carbon dioxide.



Therefore, copper is a oxidizing agent and carbon is a reducing agent

Example 2:

Iron metal is produced by the reduction of iron (III) oxide by carbon monoxide. The carbon monoxide is oxidised to carbon dioxide.



Note:

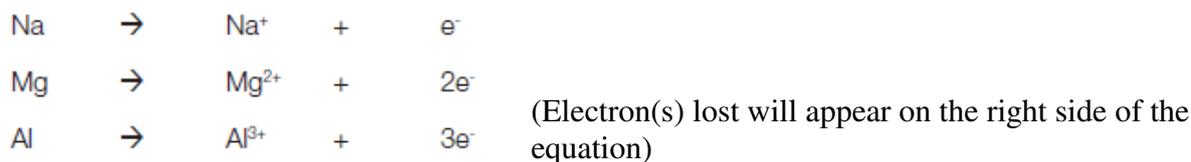
- The combined term for oxidation-reduction reaction is **REDOX** where one reactant is oxidized and the other is reduced
- Oxidation is the **loss of hydrogen or electrons**; Reduction is the **gain of hydrogen or electrons**.

Oxidation and Reduction Half-equation

Oxidation(loss of electron)	Reduction (gain of electron)
$\text{Mg} \longrightarrow \text{Mg}^{2+} + 2\text{e}^-$	$\text{Mg}^{2+} + 2\text{e}^- \longrightarrow \text{Mg}$
$2\text{O}^{2-} \longrightarrow \text{O}_2 + 4\text{e}^-$	$\text{O}_2 + 4\text{e}^- \longrightarrow 2\text{O}^{2-}$

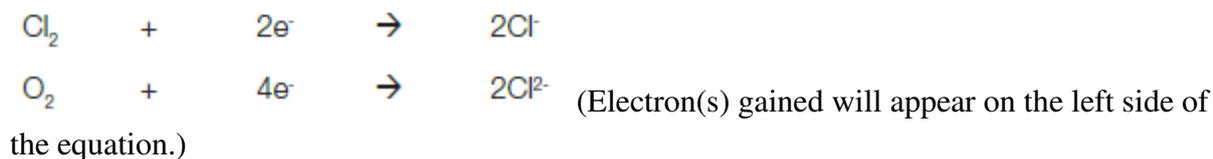
Example of Oxidation reaction

Ionisation of metal atoms to positive metal ions (cations) is an oxidation reaction as electrons are lost from it valence shell.



Example of Reduction reaction

Non-metals gaining electron(s) to form stable negative ions (anions) are reduction reactions.

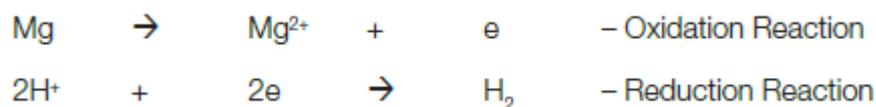


Note

Displacement Reactions of Metals is an Oxidation and Reduction. The more active metal is oxidised to its ions and the less active metals is reduced from its ionic form (in aqueous solution) to the metal. Eg Iron filings placed in a beaker of copper sulphate solution reduces the copper ions (light blue solution) to copper metal (reddish brown)



Displacement Reactions of Active Metals with dilute acid is an Oxidation and Reduction. The more active metal is oxidised to its ions and the hydrogen ions in acid is reduced is hydrogen gas (bubbles evolved)



Activity

1.For the following reactions tell which elements are oxidized and which elements are reduced:

