

CHEMISTRY

CLASS NOTES FOR CBSE

Chapter 08. Redox Reactions

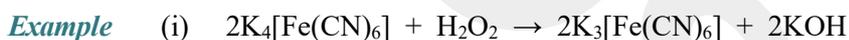
01. Introduction

There are some more reactions in which oxidation and reduction occur simultaneously. Such reactions are called redox reactions.

02. Classical Idea of Redox Reactions – Oxidation and Reduction Reactions

Oxidation involves

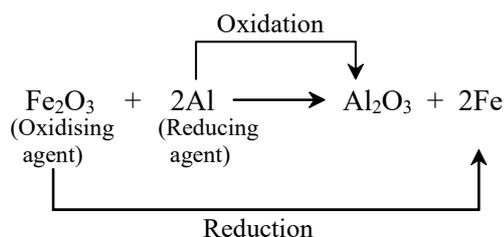
- (i) Addition of oxygen or
- (ii) Addition of electronegative element or
- (iii) Removal of hydrogen or
- (iv) Removal of electropositive element



Reducing agent or Reductant

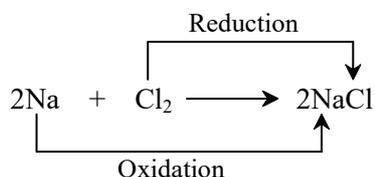
Whenever any substance is oxidised, another substance is always reduced at the same time. In other words, the oxidation-reduction reactions always occur simultaneously.

Example



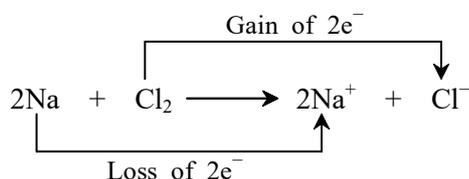
03. Redox Reactions in Terms of Electronic Concept

Let us consider a redox reaction :



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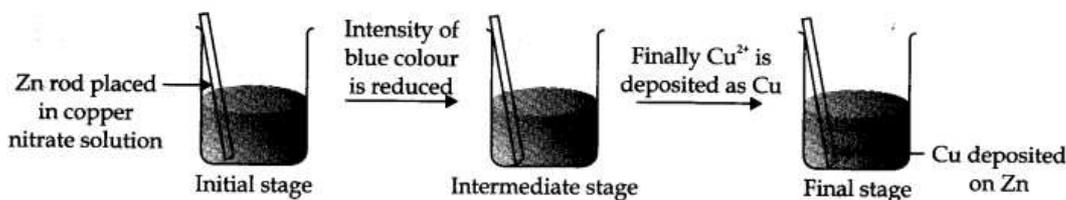
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NOTE In short
 Oxidation/Reducing agent – loss of electron
 Reduction/oxidising agent – gain of electron

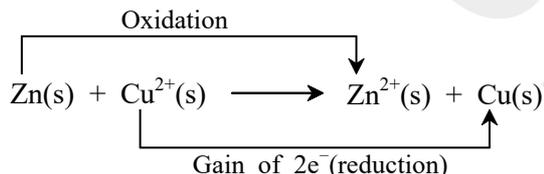
04. Competitive Electron Transfer Reactions

Place a strip of metallic zinc (Zn) in an aqueous solution of copper nitrate $\text{Cu}(\text{NO}_3)_2$ for about one hour,

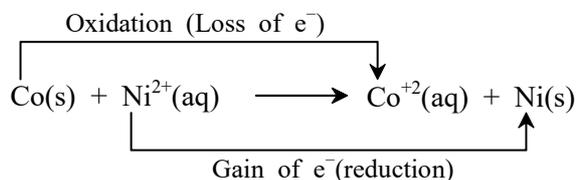
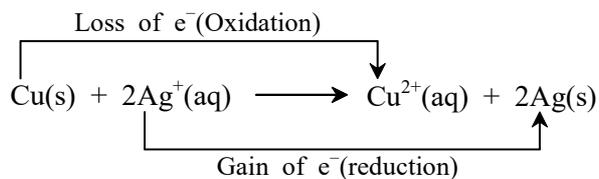


Redox reaction between zinc and aqueous solution of copper nitrate occurring in a beaker.

Now, above reaction may be written as :



Let us now extend the electron transfer reaction to copper metal and silver nitrate (AgNO_3) solution.



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In this case neither the reactants, Co(s) and Ni²⁺(aq) nor the products, Co²⁺(aq) and Ni(s) are greatly favoured. Therefore, the electron-releasing tendency of these three metals is in the order. Zn > Cu > Ag

05. Oxidation Number

The oxidation number is defined as the charge which appears on an atom of the element when all other atoms attached to it are removed in the form of their ions. Oxidation number is also called oxidation state.

06. Oxidation and Reduction in Terms of Oxidation Number

Oxidation is a chemical change in which there is an increase in oxidation number. On the other hand, reduction is a chemical change in which there is a decrease in the oxidation number.

Example



Here, MnO₂ is reduced and Al is oxidised. Thus, Al acts as a reducing agent and MnO₂ acts as an oxidising agent.

07. Types of Redox Reactions

Combination Reaction

The chemical reactions in which two or more substances combine to form a single substance are called combination reactions.

Example



Decomposition Reaction

The chemical reactions in which a compound breaks up into two or more simple substances are called decomposition reactions.

Example



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