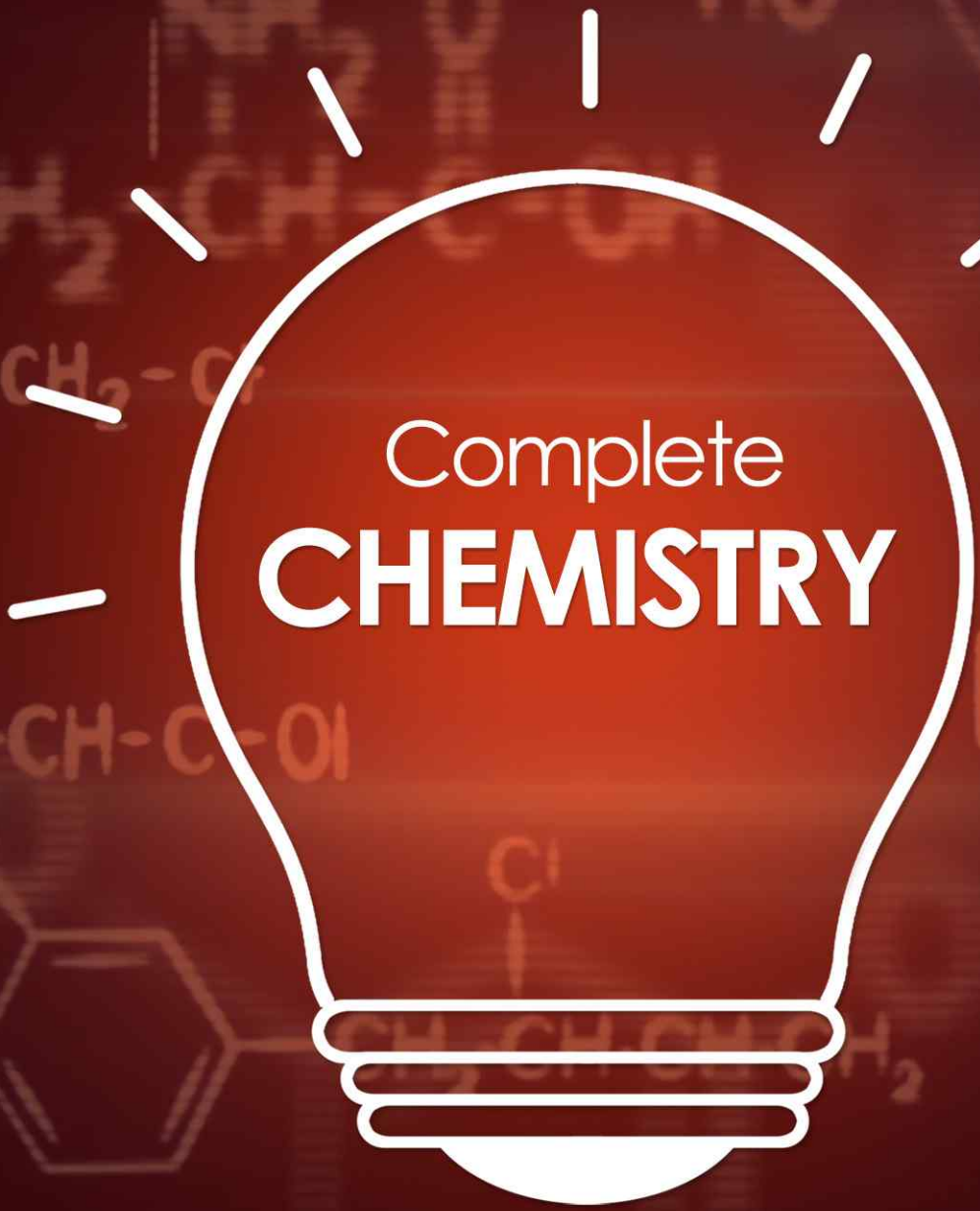
misostudy.com
smart learning



Complete CHEMISTRY

IIT-JEE · NEET · CBSE eBOOKS

CLASS 11&12th

CLASS 11th

Redox Reactions

misostudy

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

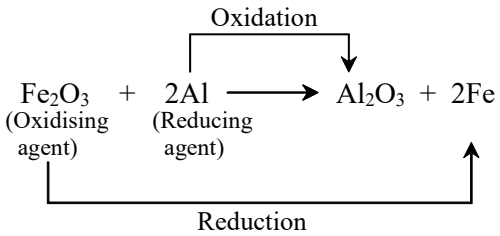
(i) Addition of oxygen or
(ii) Addition of electronegative element or
(iii) Removal of hydrogen or
(iv) Removal of electropositive element

Example (i) $2K_4[Fe(CN)_6] + H_2O_2 \rightarrow 2K_3[Fe(CN)_6] + 2KOH$

Reducing agent or Reductant

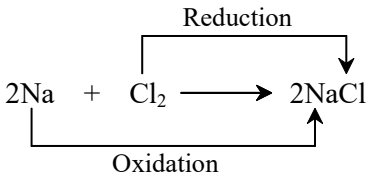
Whenever any substance is oxidised, another substance is always reduced at the same time. In other words, the oxidation-reduction reactions always occur simultaneously.

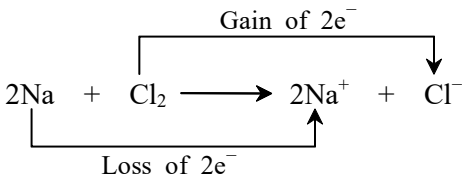
Example



04. Redox Reactions in Terms of Electronic Concept

Let us consider a redox reaction :

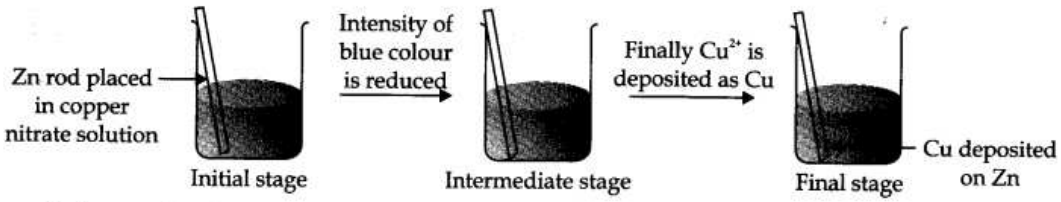




NOTE ☞ In short
Oxidation/Reducing agent – loss of electron
Reduction/oxidising agent – gain of electron

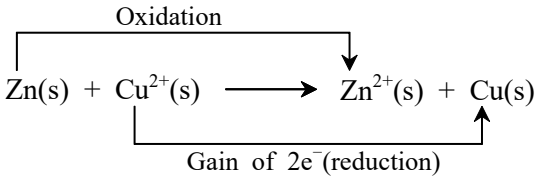
05. Competitive Electron Transfer Reactions

Place a strip of metallic zinc (Zn) in an aqueous solution of copper nitrate $Cu(NO_3)_2$ for about one hour,

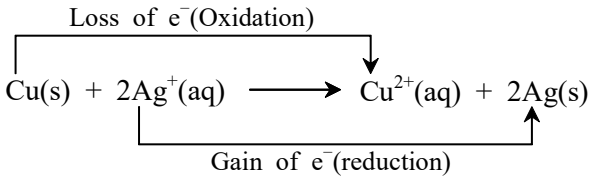


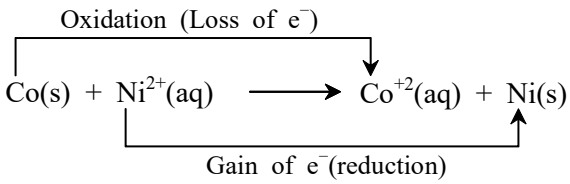
Redox reaction between zinc and aqueous solution of copper nitrate occurring in a beaker.

Now, above reaction may be written as :



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





In this case neither the reactants, Co(s) and $Ni^{2+}(aq)$ nor the products, $Co^{2+}(aq)$ and Ni(s) are greatly favoured. Therefore, the electron-releasing tendency of these three metals is in the order. Zn > Cu > Ag

06. 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.