

Unit 5 - COORDINATION CHEMISTRY

Learning Objectives

After studying this unit, students will be able to

- ❖ Define important terms in coordination chemistry
- ❖ Nomenclate the coordination compounds in accordance with the guidelines of IUPAC
- ❖ Describe different types of isomerism in coordination compounds
- ❖ Discuss the postulates of Werner's theory of coordination compounds
- ❖ Predict the geometry of coordination compounds using valence bond theory
- ❖ Apply crystal field theory to explain the colour and magnetic properties of coordination compounds
- ❖ Differentiate high spin and low spin coordination compounds
- ❖ Explain the stability of coordination compounds in terms of stability constants.
- ❖ Explain the applications of coordination compounds in day to day life

Notes and Key Points

- ❖ Isomerism is the phenomenon in which more than one coordination compounds having the same molecular formula have different physical and chemical properties due to different arrangement of ligands around the central metal atom.
- ❖ Valence bond theory helps us to visualise the bonding in complexes.
- ❖ The filling of electrons in the d orbitals in the presence of ligand field also follows Hund's rule.
- ❖ Cisplatin is a square planar coordination complex (cis- $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$), in which two similar ligands are in adjacent positions.
- ❖ It is a Platinum-based anticancer drug. This drug undergoes hydrolysis and reacts with DNA to produce various crosslinks. These crosslinks hinder the DNA replication and transcription, which results in cell growth inhibition and ultimately cell death.
- ❖ It also crosslinks with cellular proteins and inhibits mitosis.