Solutions/Answers to NCERT/CBSE CHEMISTRY Class 12(Class XII)textbook

CHAPTER NINE

Coordination Compounds

9.20

A solution of [Ni(H2O)6]2+ is green but a solution of [Ni(CN)4]2– is colourless. Explain.

[Ni(H2O)6]2+ is green but a solution of [Ni(CN)4]2– is colourless because of the differences in the number of unpaired electrons present in these molecules.In both the complexes the oxidation state of nickel is +2.The difference is in the type of ligands attached to the central nickel atom. Cyanide is a strong ligand and allows the pairing up of the electrons , leaving no unpaired electrons , hence it is colourless. Water is a weak ligand and when it co-ordinates with nickel no pairing of electrons takes place.Therefore nickel has 2 unpaired electrons in the complex [Ni(H2O)6]2+