Coordination Compounds Overview

In coordination chemistry, important terms, symbols, and definitions include:

1. **Coordination Entity**: An ion or molecule in which a central atom (usually a metal) is bonded to surrounding ligands. Example: In $K_4[Fe(CN)_6]$, the coordination entity is $[Fe(CN)_6]^{4-}$.
2. **Central Atom/Ion**: The atom, usually a metal, that serves as the core of the coordination entity. Example: In $[Fe(CN)_6]^{4-}$, iron (Fe) is the central metal ion.
3. **Ligands**: Atoms, ions, or molecules attached to the central atom. Ligands donate electron pairs to the central atom. Example: In $[Co(NH_3)_6]^{3+}$, NH_3 is the ligand.
4. **Coordination Sphere**: The central metal ion and ligands, enclosed in square brackets. Example: $[Fe(CN)_6]^{4-}$ is the coordination sphere.
5. **Coordination Number**: The number of ligand donor atoms bonded to the central metal ion. Example: In $[Fe(CN)_6]^{4-}$, the coordination number is 6.
6. **Oxidation State**: The charge of the central atom if all ligands were removed with their bonding electrons. Example: In $[Fe(CN)_6]^{4-}$, the oxidation state of iron is +2.
7. **Werner's Theory**: Describes primary valence (oxidation state) and secondary valence (coordination number). The coordination sphere satisfies secondary valence.
8. **Isomerism**: Coordination compounds can exhibit various types of isomerism, including geometric and optical. Example: Optical isomers occur when a complex has mirror-image forms.

For further explanations, coordination compound examples, and detailed descriptions of bonding theories like Valence Bond Theory (VBT) and Crystal Field Theory (CFT), consult the referenced sections
.