
Contents

Crystal Field Splitting	1
Definition	1
Mechanism of crystal field splitting	1
Strength of Ligands	2

Crystal Field Splitting

Definition

- **Crystal Field Splitting** is the phenomenon
- of *splitting* of d – orbital into **energy levels**
- The **energy levels** are e_g, t_{2g} followed by the **arrangement** of **electrons** in these **orbitals**
- based on their **pairing energy** and **crystal field splitting energy**

Mechanism of crystal field splitting

- **A central metal** atom is **surrounded** by *ligands* from all sides.
- The *electrons* of **ligands** and **metal** atom interact.
- **The** d – orbital of **metal** atom breaks into two energy levels.
 - e_g
 - t_{2g}
 - e_g has two **orbitals**
 - t_{2g} has **three orbitals** .
 - e_g has **higher** energy level.
 - t_{2g} has **lower** energy level.
- **Electrons** fill up at the **lower** energy level.
- The remaining **electron** have two choices:
 - **pair** up with t_{2g}

-
- **move** to e_g
 - **Electrons** move to e_g if,
 - **Pairing Energy** > **Crystal Field Splitting Energy**
 - This case has **high spin complex**.
 - **Electrons** pair at t_{2g} if,
 - **Crystal Field Splitting Energy** > **Pairing Energy**
 - This case has **low spin complex**

Strength of Ligands

- **Weak field ligands** have **less** gap between e_g and t_{2g} .
- **Strong field ligands** have **more** gap between e_g and t_{2g} .