

Conceptual Questions

What is the Big Idea?

The properties of transitional metals are determined by the splitting of their d-orbitals.

What is a complex ion?

Basically a metal combines with a molecule with a lone pair to form a charged species

What is a counter ion?

Basically a charged molecule that is not apart of the complex ion. Usually denoted by being outside the brackets

What is a coordination compound?

A compound that consist of both counter ions and complex ions

What is a ligand?

A group of molecules that have a lone pair in order to bond to a metal

What is a chelate?

A type of ligand that can bond on a metal in two or more places

What determines how big of a gap between the split d-orbitals?

The strength of the splitting is determined where the ligands lies in the spectrochemical series

What is the difference between a low spin complex and a high spin one?

A high spin complex is the maximum number of unpaired electrons while low spin is the minimum number of unpaired electrons.

Structural Isomer vs. Stereo isomerism

Structural Isomerism	Stereoisomerism
same atoms but different bonds	same bonds different atoms
Coordination: Ligand in coordination compound changes	Geometrical: atoms can assume different arrangements
Linkage: If ligand can bond in more than one place, the point of attachment can change	Optical: Mirror image is not identical to molecule

Ligand Field Theory vs. Crystal Field Theory

Crystal Field Theory	Ligand Field theory
Assumes bond is entirely ionic	Assumes both covalent and ionic properties
Better than LE Model because it focuses only on the d-orbitals, which gives the metal its properties	Explains which ligands cause small splitting and which cause large splitting between d-orbitals
Explains color and magnetic properties	Closer to pi bond => weak field
	Closer to pi antibonding => strong field

Common Ligand Names

I-	iodo
CN-	cyano
NH3	ammine
CH3NH2	methylamine
CO	carbonyl
NO	nitrosyl
F-	bromo
Cl-	chloro
OH-	hydroxo
en	enthylenediamine
ox2-	oxalato

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By **Marnise**
cheatography.com/marnise/

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