

CONCEPT: COORDINATION NUMBERS & GEOMETRY

Coordination Numbers

- Represents the number of _____ bonded to the central metal cation.
 - The most common coordination numbers are _____, _____, and _____.

EXAMPLE: Determine the coordination number of the complex ion: $[\text{Cr}(\text{H}_2\text{O})_4\text{Br}_2]\text{F}$.

Molecular Geometry of Coordination Complexes

- Coordination complexes form predictable geometries based on their coordination number and electron configuration.
 - With a coordination number of _____ you must determine the cation's electron configuration.
 - _____ electron configuration = _____ □ _____ electron configuration = _____

Molecular Geometry			
Coordination Number	Shape	Geometry	Memory Tool
2	$\left[\text{Br}-\text{Cu}-\text{Br} \right]^{-}$	_____	_____ points in a straight _____.
4	$\left[\begin{array}{c} \text{OH} \\ \\ \text{HO}-\text{Zn}-\text{OH} \\ \\ \text{HO} \end{array} \right]^{2-}$	_____	$d^{\text{TEN}} = \text{TEtrahedral}$
4	$\left[\begin{array}{c} \text{NC} \quad \text{CN} \\ \diagdown \quad / \\ \text{Ni} \\ / \quad \diagdown \\ \text{NC} \quad \text{CN} \end{array} \right]^{2-}$	_____	  Square (_____) x Plane (_____) = 8 (d^8)
6	$\left[\begin{array}{c} \text{NH}_3 \\ \\ \text{H}_3\text{N}-\text{Co}-\text{NH}_3 \\ / \quad \backslash \\ \text{H}_3\text{N} \quad \text{NH}_3 \\ \\ \text{NH}_3 \end{array} \right]^{3+}$	_____	 Octopus: _____ - _____ = 6.

EXAMPLE: Determine the geometry for the following complex ion: $[\text{Cr}(\text{NH}_3)_4\text{Cl}_2]^+$.

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PRACTICE: Correctly label all the components of the coordination complex and its coordination number: $\text{Na}_2[\text{SnCl}_6]$.

PRACTICE: Determine the geometry for the following complex ion: $[\text{Ni}(\text{OH})_4]^{2-}$.

PRACTICE: Determine the geometry for the following complex molecule: $\text{Pd}(\text{H}_2\text{O})_4$.