

UNIT 5 • COORDINATION COMPOUNDS

Naming of Mononuclear Coordination Compounds

Decoding the IUPAC syntax for complex ions and coordination entities.

Additive Nomenclature

Names are built linearly by listing ligands as prefixes to the central metal atom.

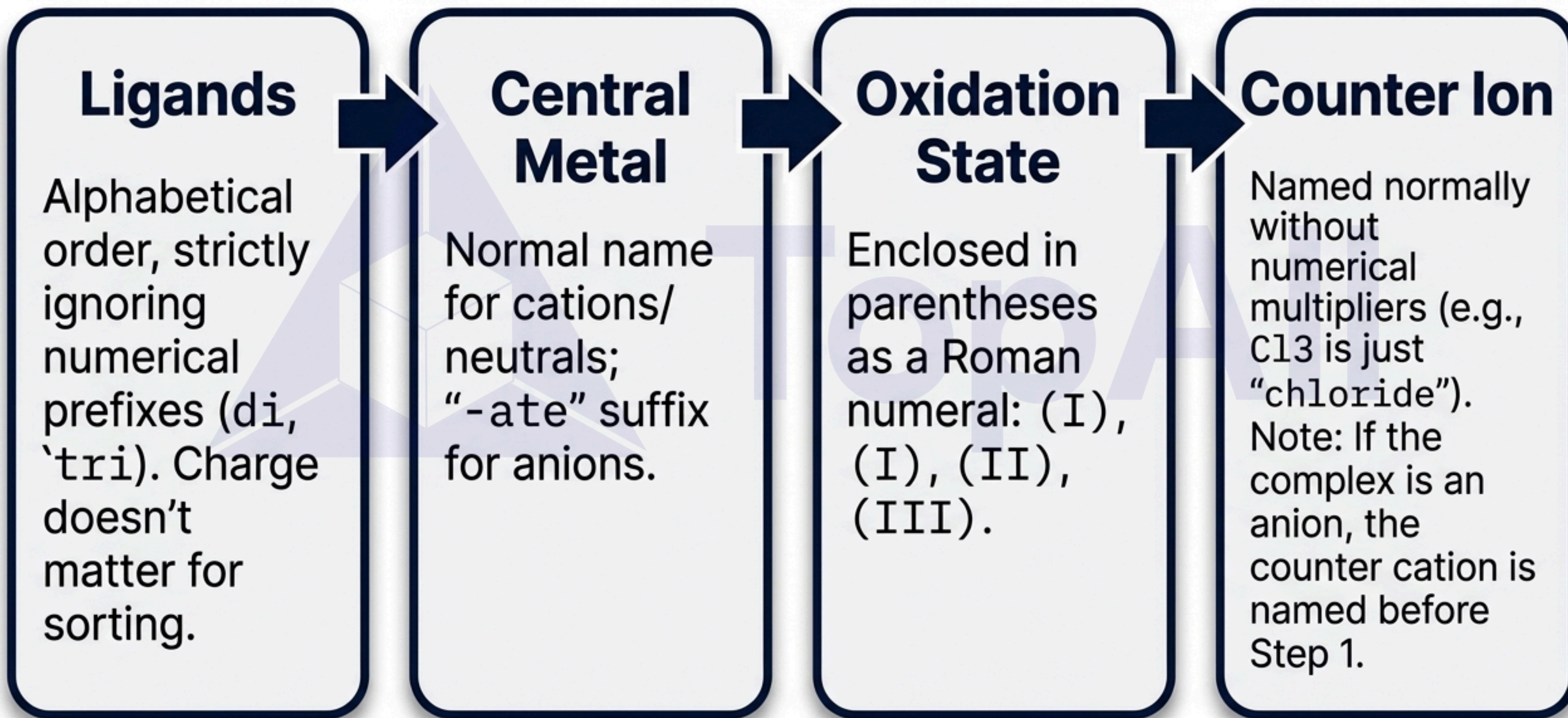
Special Multipliers

Use "bis", "tris", "tetrakis" when a ligand's name already contains a numerical prefix (e.g., ethane-1,2-diamine).

The "-ate" Suffix

Added exclusively to the central metal's name only when the complex ion carries a net negative charge.

The IUPAC Naming Algorithm





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$$E=mc^2$$



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The Translation Matrix: Special Ligand Names

Neutral and cationic ligands usually keep their normal chemical names, except for these four vital syntax translations:

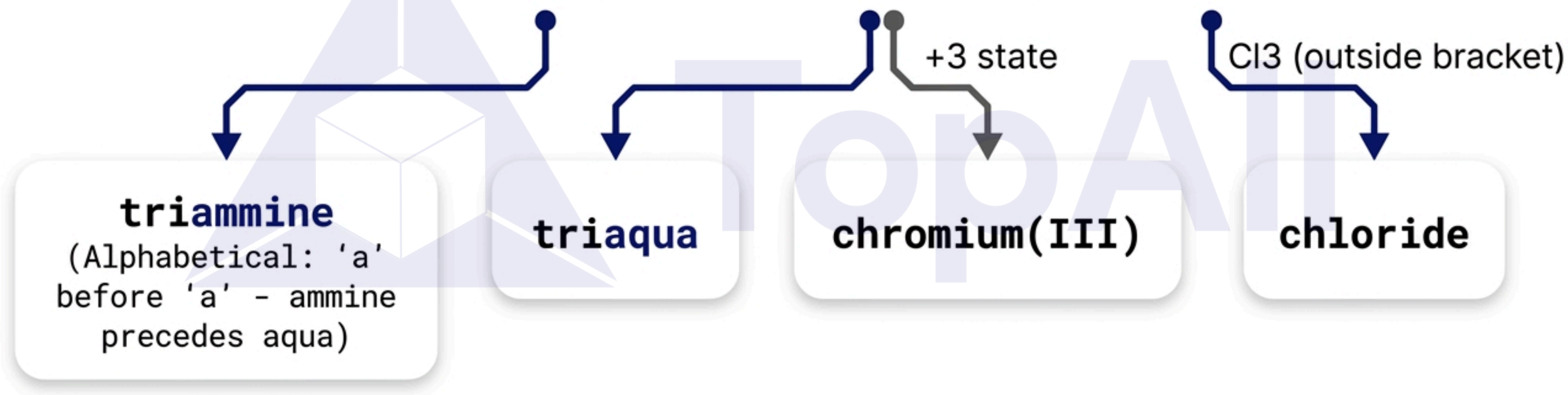
$\text{H}_2\text{O} \rightarrow \text{aqua}$

$\text{NH}_3 \rightarrow \text{ammine}$
(Note the double 'm')

$\text{CO} \rightarrow \text{carbonyl}$

$\text{NO} \rightarrow \text{nitrosyl}$

Parsing a Complex Cation



triamminetriaquachromium(III) chloride

The Cation/Anion Split

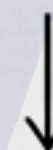
Cationic Complex



diamminesilver(I)

Metal is named normally because the coordination sphere has a positive charge.

Anionic Complex



dicyanidoargentate(I)

Metal takes its Latin root + "-ate" because the coordination sphere is negative.

diamminesilver(I)dicyanidoargentate(I)

Watch for this: The Anionic Complex Trap

Always check the net charge of the square brackets before naming the metal. The most common exam error is naming the metal normally when the coordination sphere is a net anion.

If Cation/Neutral:	If Anion:
Cobalt	Cobaltate
Iron	Ferrate
Silver	Argentate
Copper	Cuprate

Key Takeaways

- **Alphabetical Ligands First:** Always list ligands alphabetically before the central metal, completely ignoring their numerical prefixes (di, tri, bis) when sorting.
- **Mind the Anion:** If the coordination entity (square brackets) carries a net negative charge, the central metal's name must end in the suffix "-ate".



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