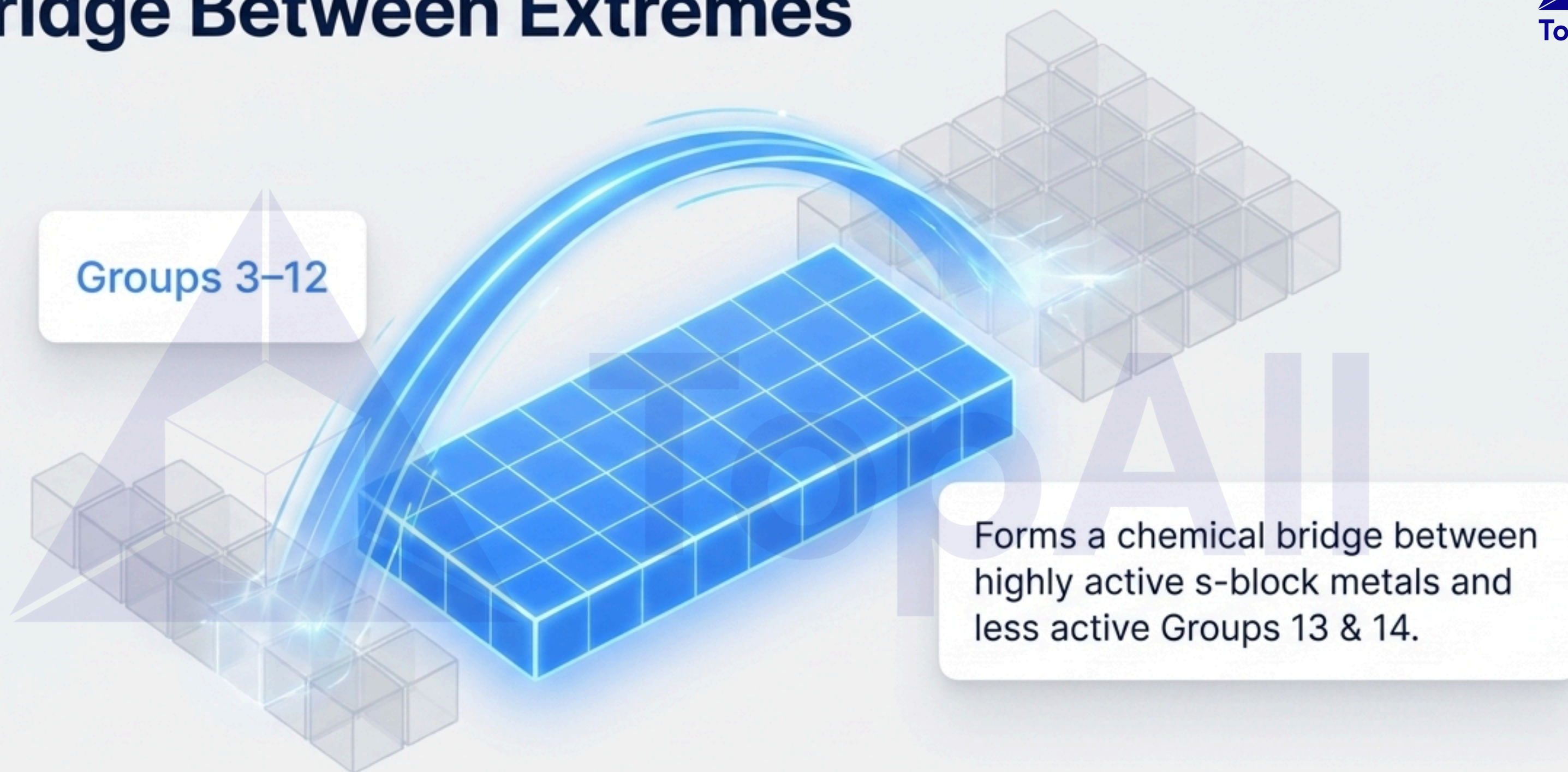


CONCEPT 10 / INORGANIC CHEMISTRY

Transition Elements

The Centre of the Table

The Bridge Between Extremes



The defining trait: Inner d-orbitals are progressively filled with electrons across this block.

The General Configuration



Inner d-orbitals progressively filling
(holds 1 to 10 electrons).

Outermost s-orbital (can
hold 0, 1, or 2 electrons).

Crucial Rule: The filling of inner (n-1) orbitals is what formally defines this block.



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$$E=mc^2$$



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Hallmark Properties of Transition Metals



Coloured Ions

Result from d-d electron transitions.



Variable Oxidation States

Due to similar energies of $(n-1)d$ and ns electrons.



Paramagnetism

Caused by the presence of unpaired electrons.



Catalytic Activity

Used extensively as catalysts in industrial processes.

Configuration Exceptions



The Group 12 Outliers

Zn, Cd, Hg



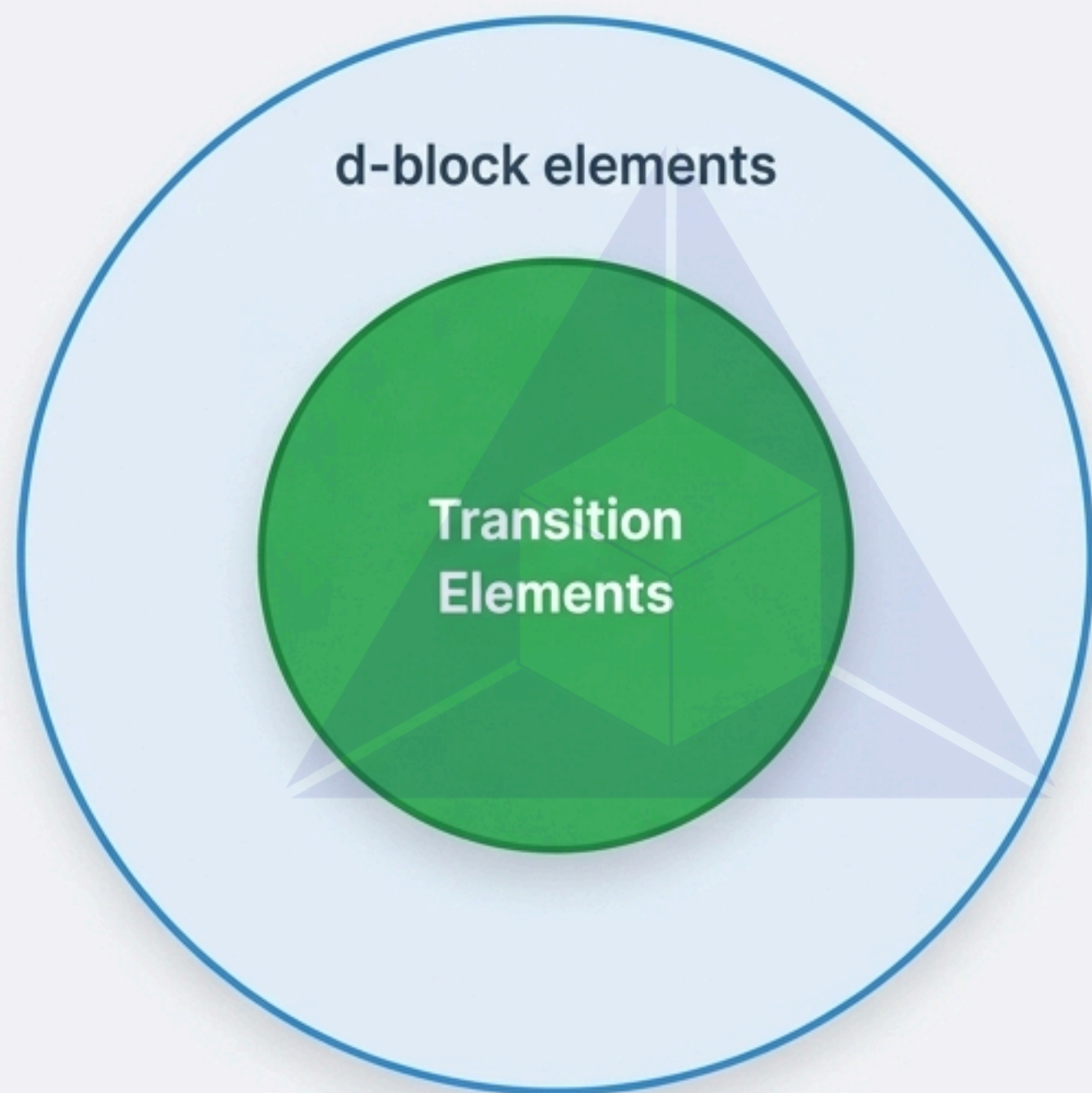
The Palladium Anomaly

Pd



Fully filled d-orbitals fundamentally alter expected chemical behavior.

⚠ JEE Trap: Semantic Differences



Core Insight:

All transition elements are d-block, but NOT all d-block elements are transition elements.

Rule:

True transition elements require an incomplete d-subshell in their ground state or common oxidation states.

The Culprits: Zinc (Zn), Cadmium (Cd), and Mercury (Hg) have fully filled $(n-1)d^{10}$ configurations.

Verdict: They are d-block elements, but are NOT considered typical transition elements.



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