

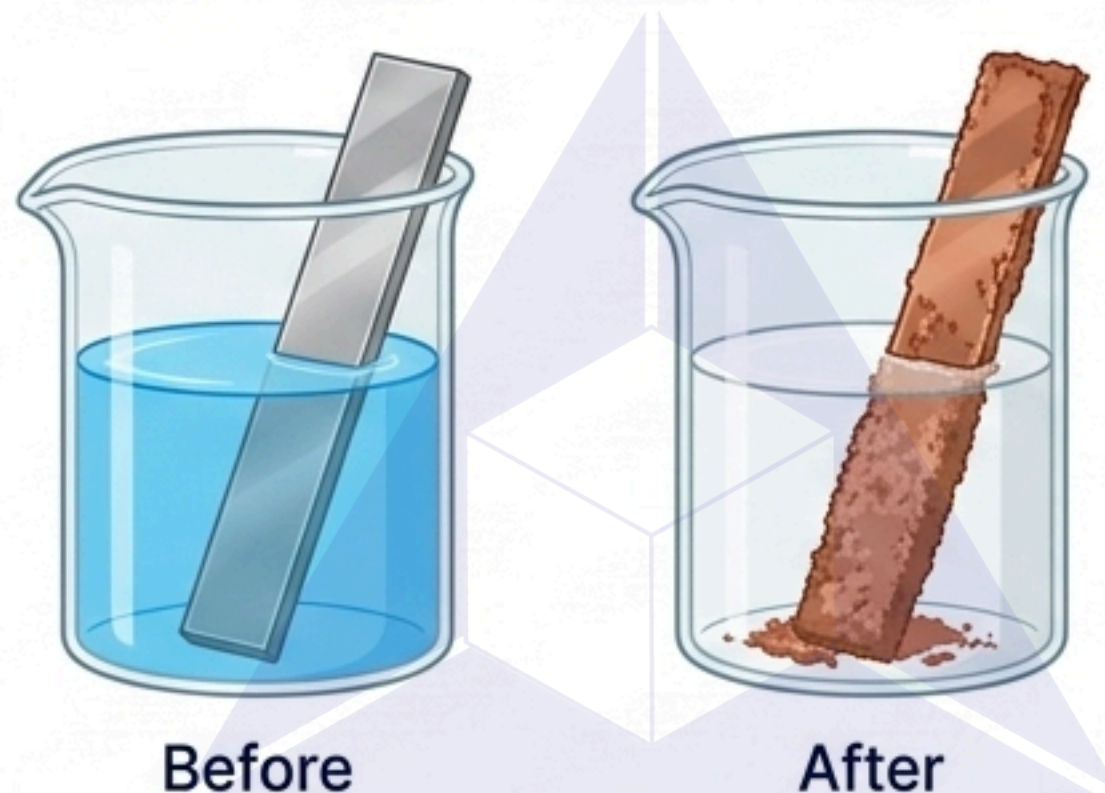
Which Metal Gives Electrons Faster?

Competitive Electron Transfer Reactions



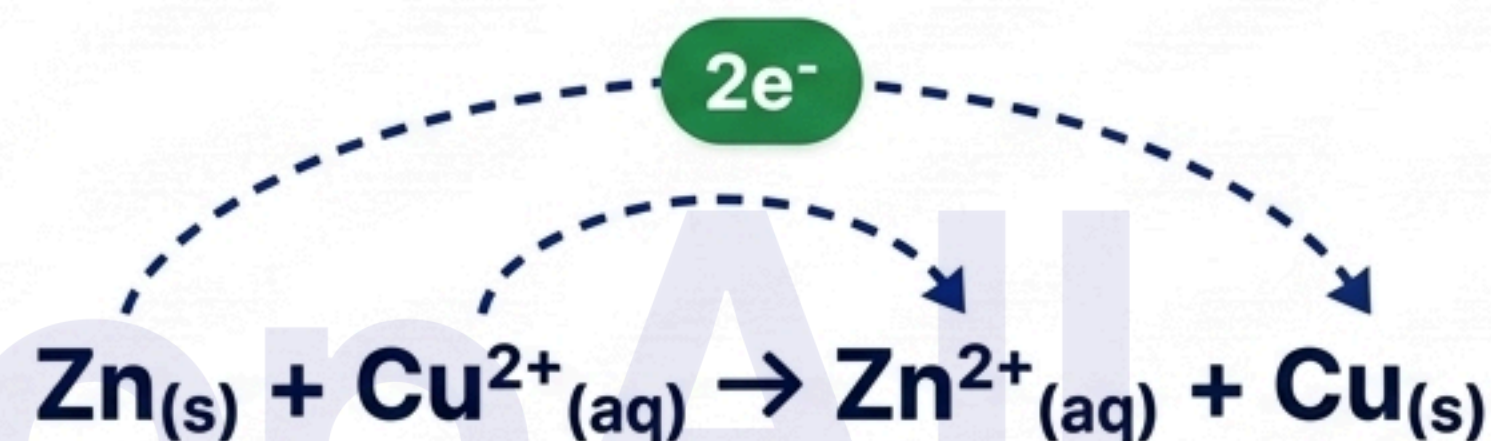
Round 1: Zinc vs. Copper (Zn vs. Cu^{2+})

MACRO: The Observation



- Blue copper nitrate solution fades to colorless.
- Reddish metallic copper deposits on the grey zinc strip.

MICRO: The Chemistry

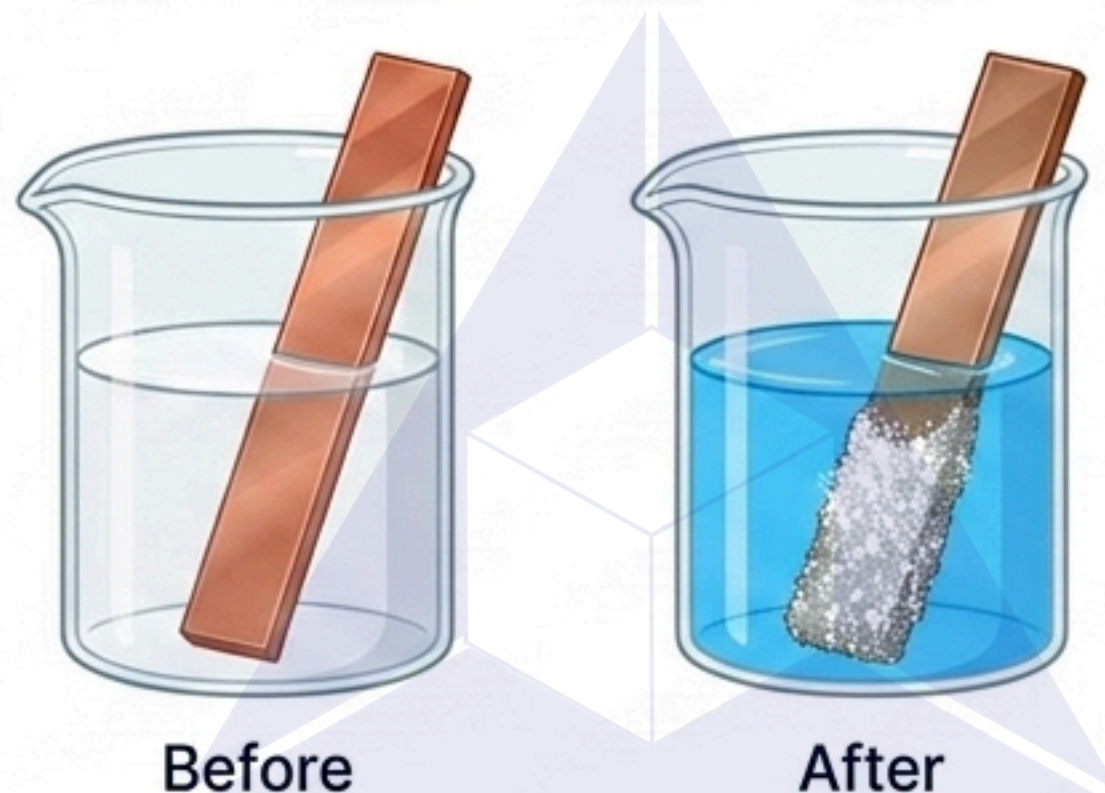


Passing H_2S gas through the colorless solution in an alkaline medium yields white ZnS , confirming Zn^{2+} formation.

KEY TAKEAWAY: Zinc oxidizes (loses e^-), Copper reduces (gains e^-). Zinc is the stronger electron donor.

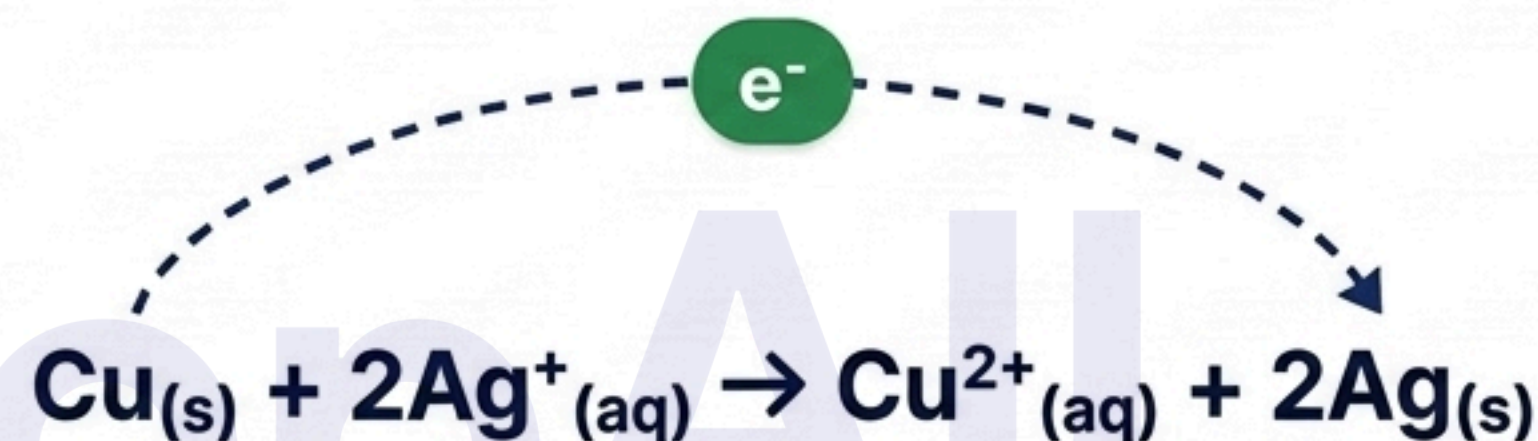
Round 2: Copper vs. Silver (Cu vs. Ag⁺)

MACRO: The Observation



- Colorless silver nitrate solution turns blue.
- Silver deposits heavily onto the copper strip.

MICRO: The Chemistry



Passing H₂S gas through the blue solution in an alkaline medium yields black CuS, confirming Cu²⁺ formation.



JEE TRAP ALERT: Relative Roles — Just because Cu gained electrons from Zn doesn't mean it always acts as an acceptor. Against Ag⁺, Copper is the electron donor!



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$$E=mc^2$$



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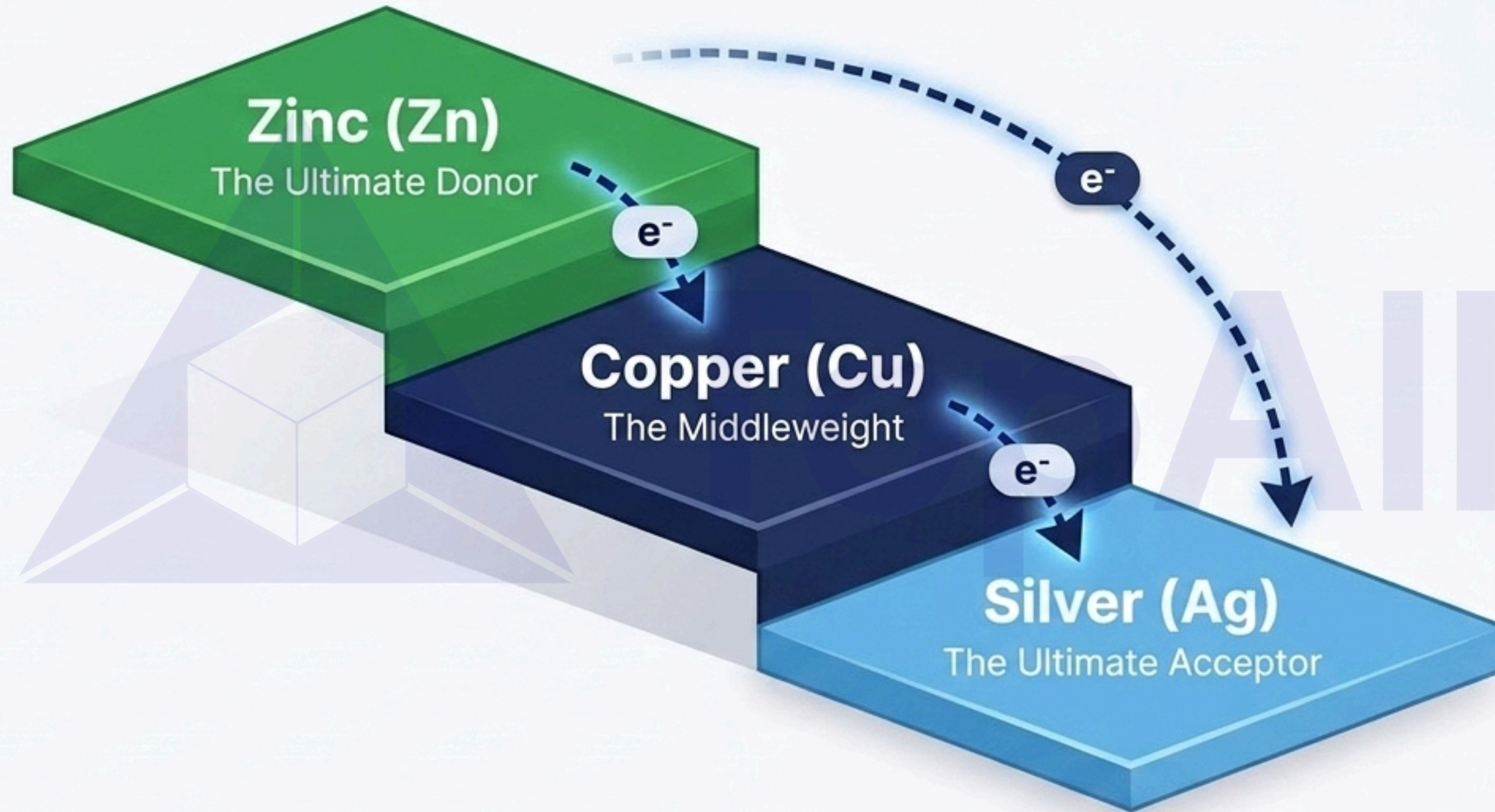
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The Electron Releasing Hierarchy



KEY TAKEAWAY: The capability to lose electrons is strictly comparative: $Zn > Cu > Ag$.

The Grand Framework: The Activity Series

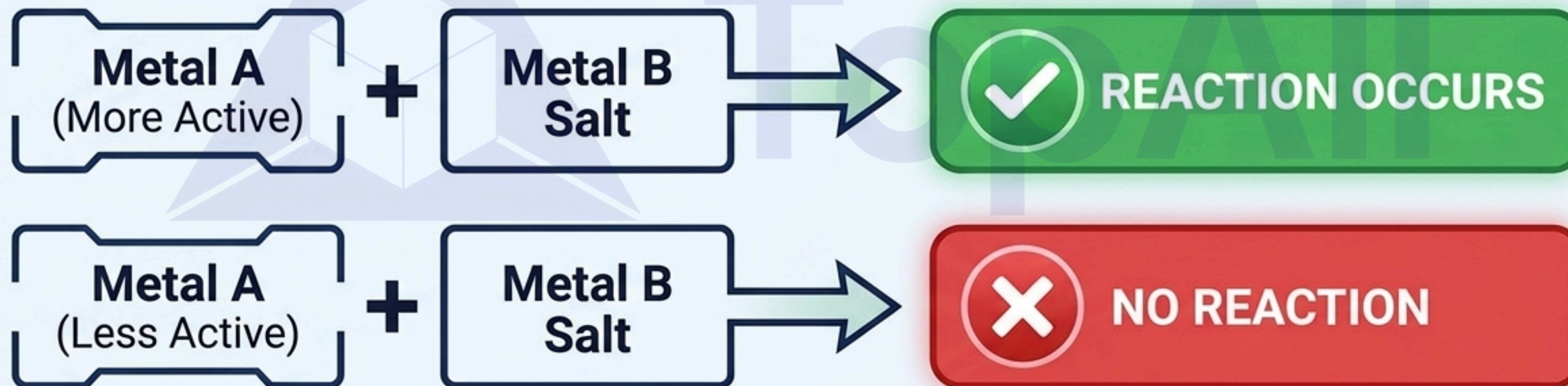


LOOKING AHEAD: This exact competition for electrons allows chemists to separate the half-reactions and harness the flow of electricity, forming the basis of Galvanic Cells.

Exam Snapshot: Displacement Rules

Formula Bank

RULE: A **stronger reductant** (higher on the activity series) **displaces a weaker one** from its aqueous salt solution.



JEE TRAP ALERT: Watch out for reverse reactions! Placing a Cu strip in a ZnSO_4 solution results in **NO REACTION**. The equilibrium state heavily favors the products of the spontaneous forward reaction



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