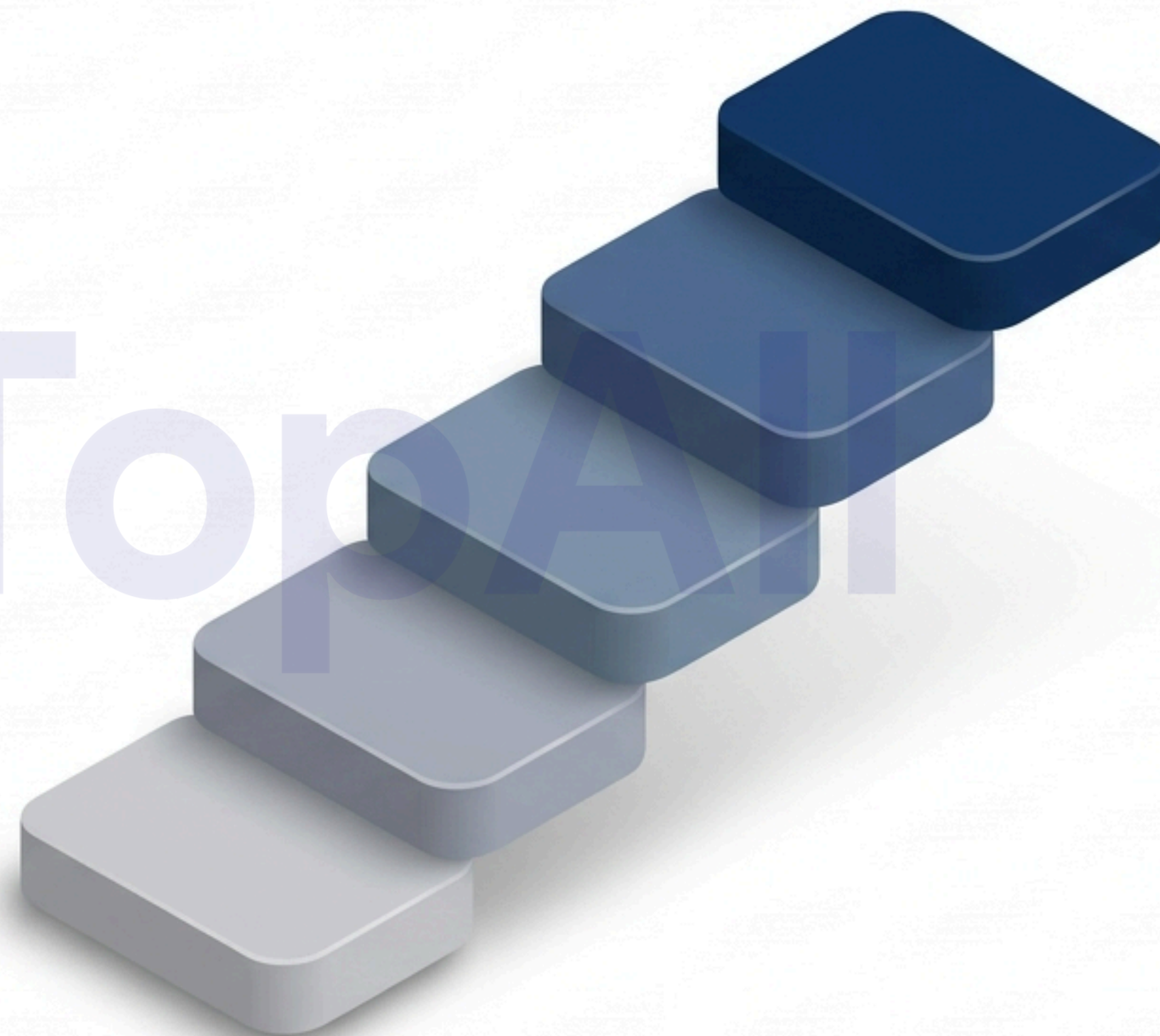


Oxides and Oxoanions of Metals

Mastering the relationship between oxidation state, ionic character, and acidity.



Key Vocabulary

MO Oxides

The fundamental, base-level oxides formed by all 3d metals (except Scandium). These lowest-oxidation-state oxides are highly **ionic** and typically basic in nature.

Amphoteric

The crucial bridge concept. An oxide that can react with both acids and alkalis. In transition metals, amphoterism is the hallmark of the middle-tier oxidation states.



You've Learned the Theory. Let's Test Them Now.

$$E=mc^2$$



Turn theory into marks with **unlimited MCQs, smart analysis, and focused revision.**

Practice Now



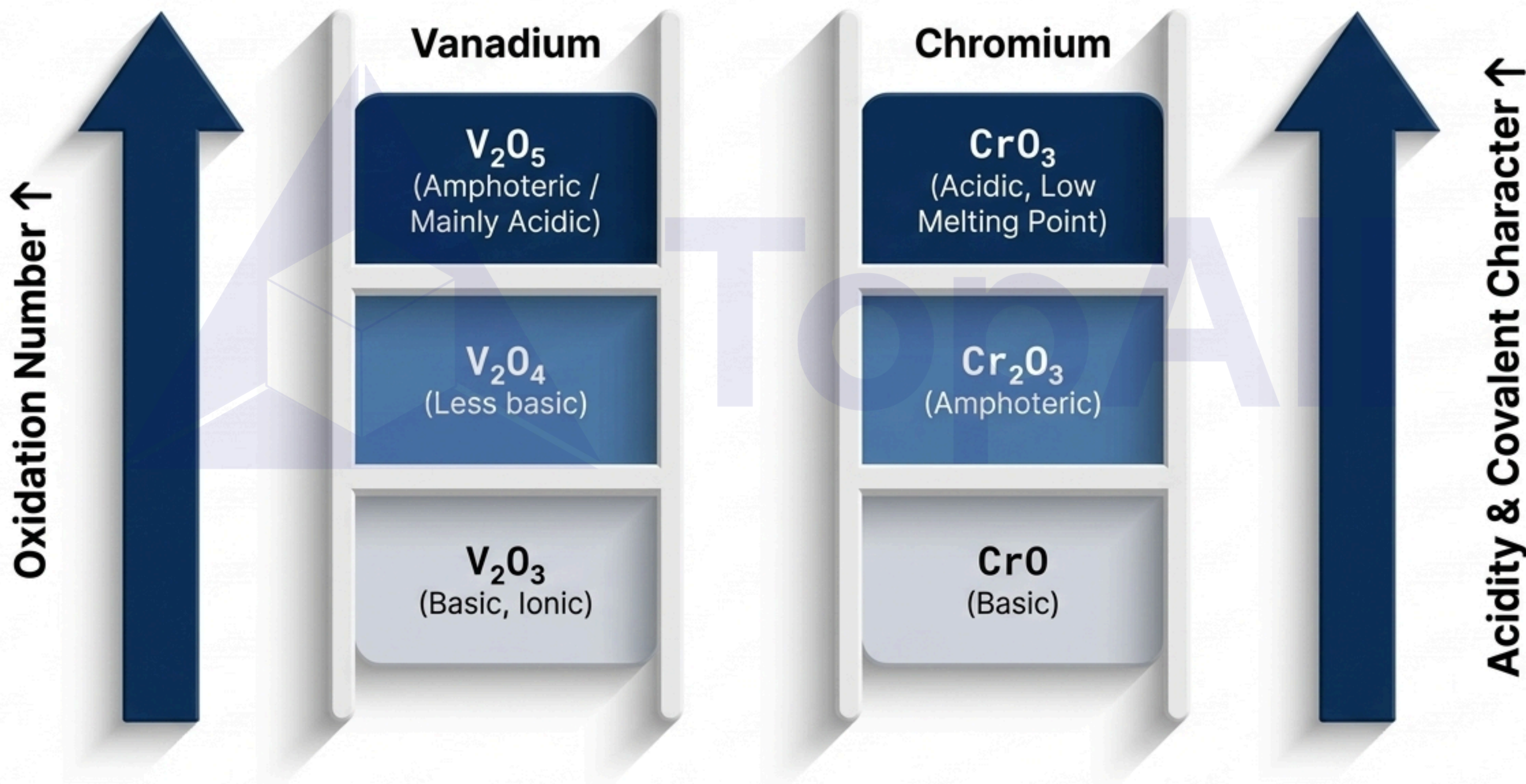
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Key Highlights

- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
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The Oxidation Ladder: A Predictable Progression



The Reaction Matrix: Proving Amphoterism



(Reacts only with acid; less basic)



(Top-tier oxidation state acting as an acid)



(Top-tier oxidation state acting as a base)

**Definitive
Amphoteric
Behavior**

Watch for this:

The "Higher Oxidation = More Basic" Trap

A common intuitive mistake is assuming that a higher oxidation number means a stronger ionic lattice or a stronger base. The reality is the exact opposite.

Oxidation Number $\uparrow$ = Covalent Character $\uparrow$ = Acidity $\uparrow$

Consider Manganese (+7). Mn_2O_7 is NOT a solid ionic lattice. It is a **covalent green oil** that is highly acidic (yielding HMnO_4).

Which of the following sets correctly represents the products formed when V_2O_5 reacts with an alkali and an acid, respectively?

A. VO^{2+} and VO_2^+

B. VO_4^{3-} and VO_2^+ ✓

C. VO_2^+ and VO_4^{3-}

D. VO_4^{3-} and VO^{2+}

Recall the specific oxoanions produced by the amphoteric V_2O_5 from the Reaction Matrix.

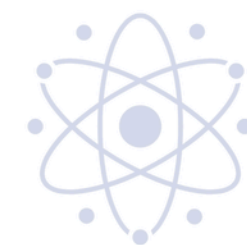
Key Takeaways

- **The Overarching Rule:** As a transition metal's oxidation state increases, its ionic character decreases and its acidity increases. (Remember the covalent Mn_2O_7 oil).
- **The Amphoteric Landmarks:** Middle-to-high oxidation states reliably form amphoteric oxides. V_2O_5 is the classic exam example, reacting with acids to form VO_2^+ and with bases to form VO_4^{3-} .



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