



One Map Connects Every Periodic Trend.

Master the logic of elements: from atomic radii to chemical reactivity.

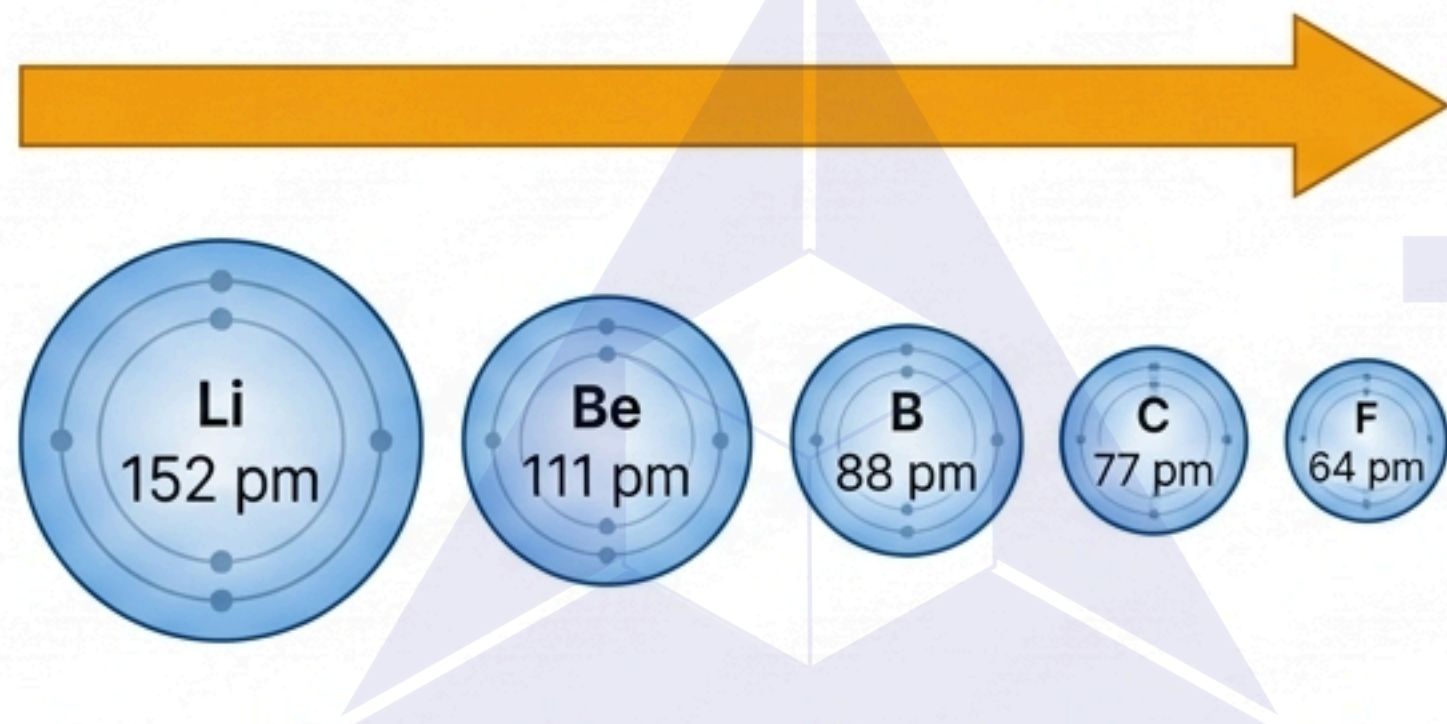
JEE Advanced Focus

Concept 20

Chapter 3

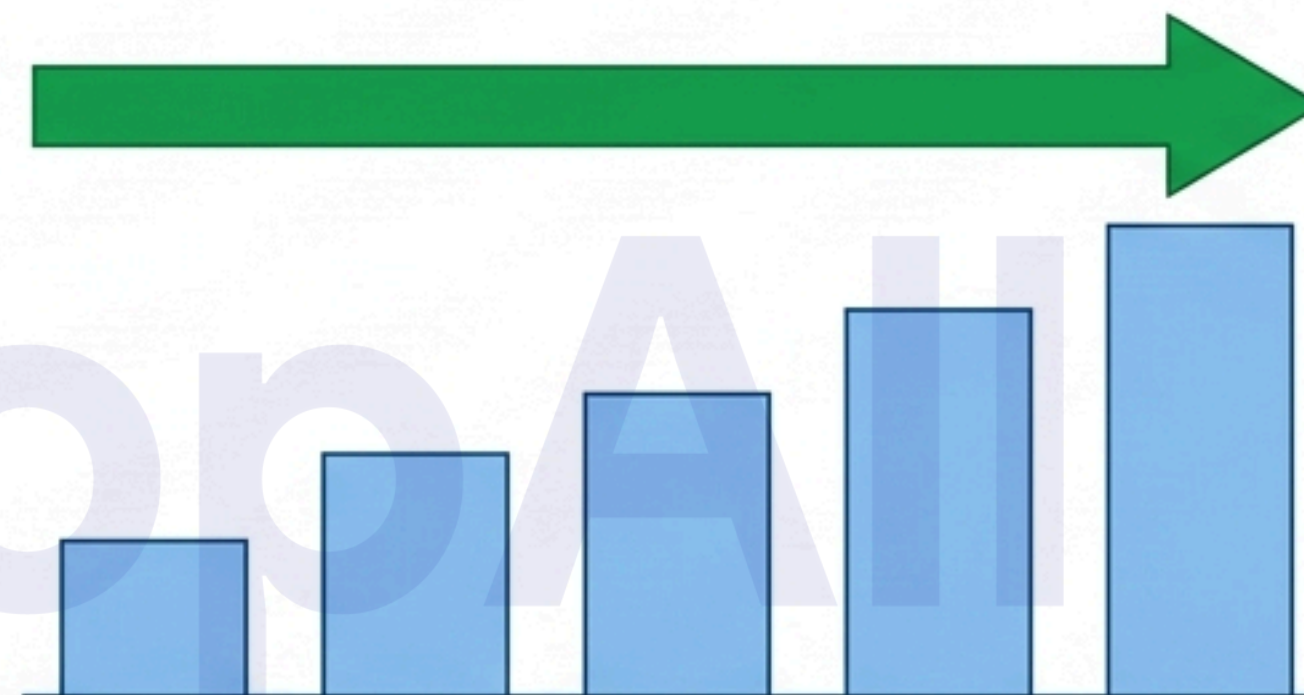
The Core Tug-of-War: Across a Period

Atomic Radius Decreases



Increasing effective nuclear charge (Z_{eff}) outweighs inner core shielding.

Ionization Enthalpy ($\Delta_i H$) Increases



Electrons held tighter by the nucleus = More energy required to remove them.

Exam Note: Atomic radius and Ionization Enthalpy are inversely proportional across a period.

The Drive for Noble Gas Configuration

18



Electron Gain Enthalpy ($\Delta_{\text{eg}}H$) becomes highly negative toward the Halogens.



Alert!

F (−328 kJ/mol) is less negative than **Cl** (−349 kJ/mol).

O is less negative than **S**.

Reason: Intense inter-electronic repulsion when adding an electron to the extremely compact $n=2$ orbital!

Halogens (Group 17) are one electron away from a stable noble gas core ($ns^2np^5 \rightarrow ns^2np^6$). They release immense energy when gaining it.



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

$$E=mc^2$$



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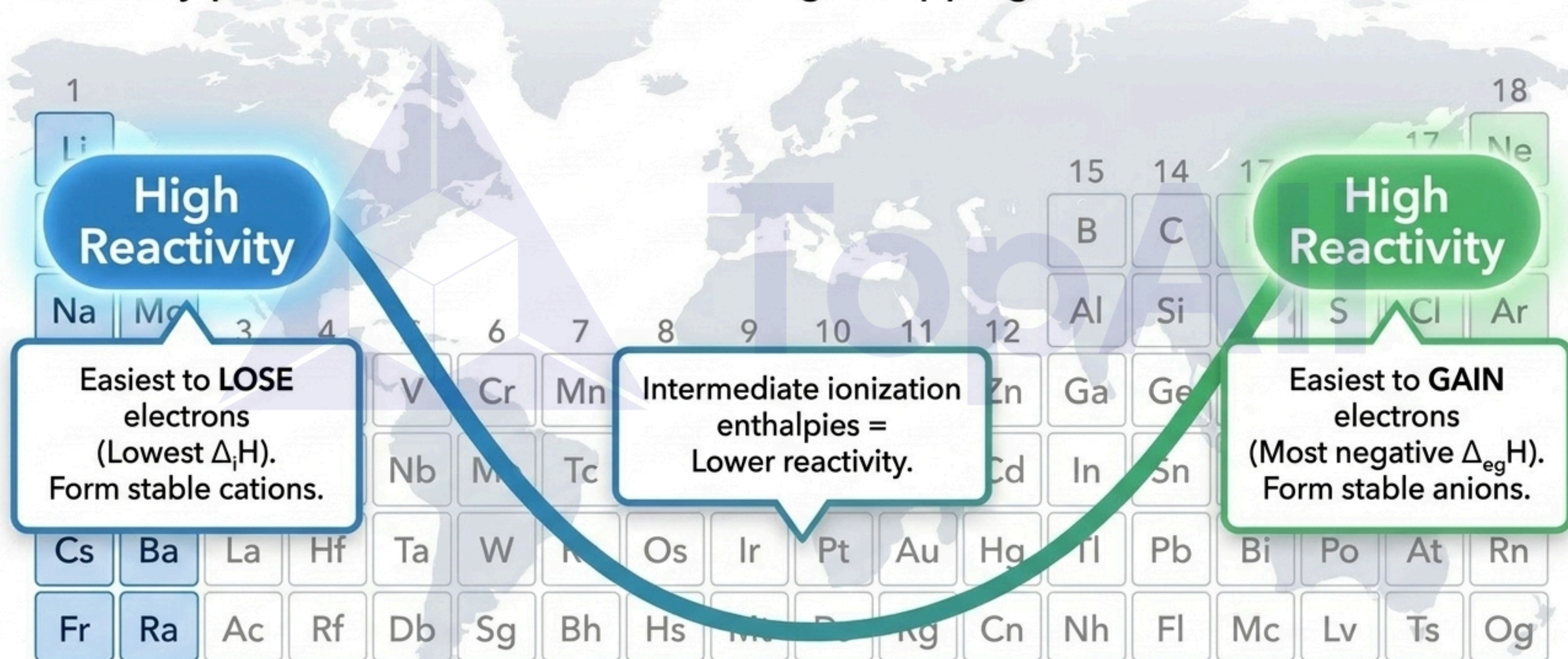
Key Highlights

- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
- » Get Clear Explanations, Not Just Marks
- » Track Your Performance Smarter



The 'U-Curve' of Chemical Reactivity

Reactivity peaks at the extreme left and right, dipping to its lowest in the center.



The Diagonal Divide: Metallic Character



Metallic character decreases from left to right, and increases down a group.



Key Takeaway Panel

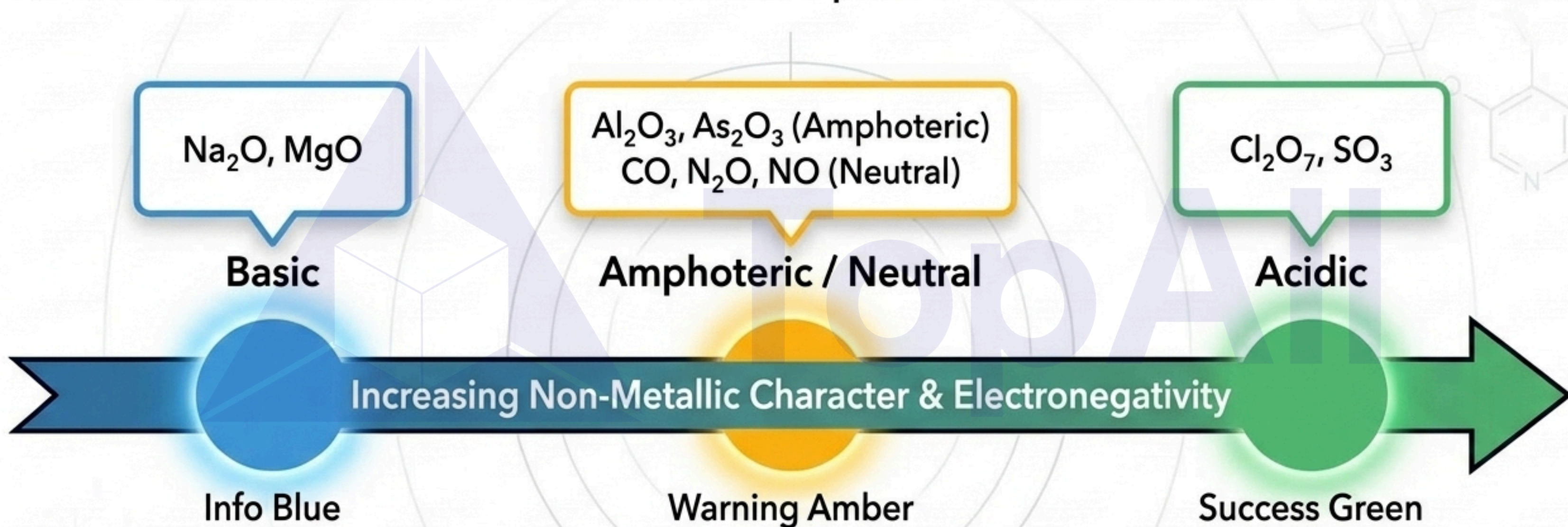
Electronegativity (Pauling Scale: Li 1.0 → F 4.0) is inversely related to metallic character.

High EN = Non-metal.

The Chemical Fingerprint: Nature of Oxides



As non-metallic character increases across a period, oxides shift from Basic to Acidic.



Proving the Extremes: Oxide Reactions



Testing extreme left and extreme right oxides with water.

The Basic Extreme (Group 1)



Forms a strong base.

The Acidic Extreme (Group 17)



Forms a strong acid (Perchloric acid).

Both endpoints can be qualitatively proven using simple Litmus tests.

The Master Logic Flow

How fundamental structure dictates all chemical behavior.

Info Blue
The Cause

Electronic
Configuration &
Effective Nuclear
Charge (Z_{eff})



Warning Amber
Physical Properties

Atomic Radius,
Ionization Enthalpy
($\Delta_i H$), Electron Gain
Enthalpy ($\Delta_{\text{eg}} H$)



Success Green
Chemical Reactivity

Metallic Nature,
Reducing/Oxidizing
Power, Nature of
Oxides

Configuration controls properties. Properties control reactivity.
Master the vectors of the Periodic Table, and you master the elements.



You've Learned the Theory.

Now Let's Test It.

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