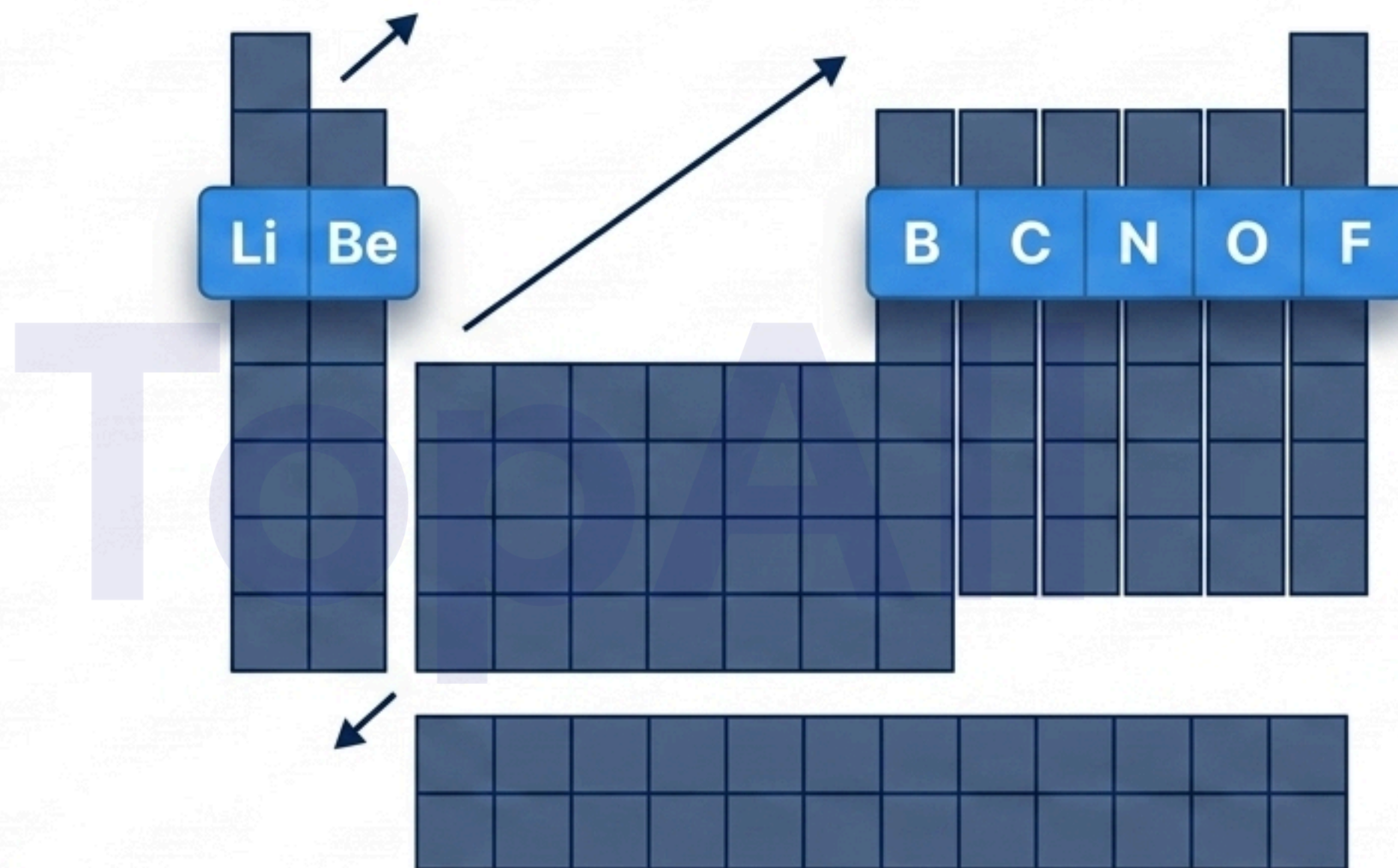


[Concept 19]

Why First Members Behave Differently

The Anomalous Properties of Second Period Elements

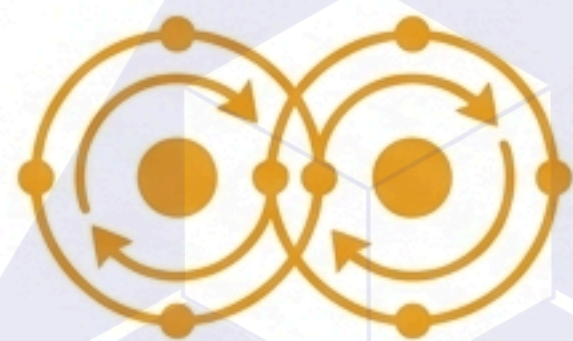


Rank-Saver Series

The s-Block Rulebreakers: Lithium and Beryllium

Group 1 and 2 elements are traditionally ionic, but the first members strictly violate this trend.

[Li & Be]



Pronounced Covalent Character

[Na, K, Rb, Cs & Mg, Ca, Sr, Ba]



Predominantly Ionic Compounds

Insight: The behavior of Li and Be is actually closer to elements in entirely different groups than their own.

The Diagonal Relationship

First members exhibit striking similarities to the second element of the adjacent group.



This cross-group similarity is a direct manifestation of anomalous atomic properties balancing out across periods and groups.



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



At prep.topall.app

Key Highlights

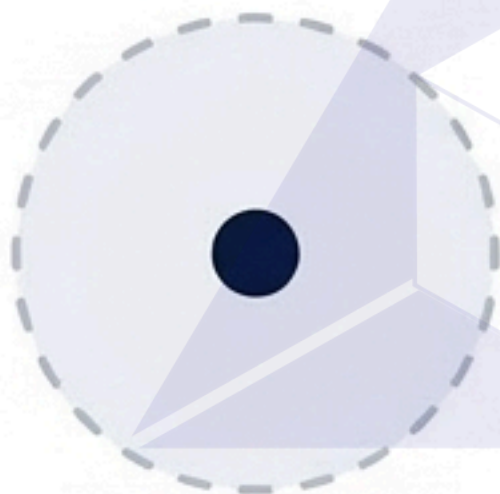
- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
- » Get Clear Explanations, Not Just Marks
- » Track Your Performance Smarter



The Root Causes of Anomalous Behavior

Why do Period 2 elements deviate so sharply from periodic trends?

Small Atomic Size



Extreme proximity of valence electrons to the nucleus.

Large Charge/Radius Ratio



Results in exceptionally high polarizing power, driving covalent character (Fajans' Rules).

High Electronegativity



Unusually strong tendency to attract shared electron pairs compared to heavier group members.

The Hard Cap: Maximum Covalency is 4

The absence of d-orbitals strictly limits the bonding capacity of Period 2 elements.

2nd Period
(Boron)



[2s]



[2p]



[BF₄]⁻ (Max covalency = 4)

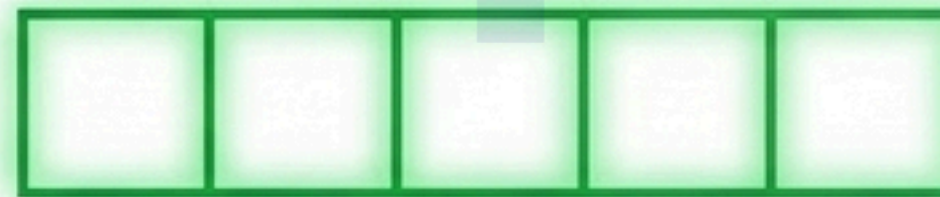
3rd Period
(Aluminum)



[3s]



[3p]



Unlocked Zone

[3d]

[AlF₆]³⁻
(Expands > 4)

Key Takeaway Panel: Only 4 valence orbitals are available. Period 2 elements cannot expand their octet.

The Superpower: $p\pi-p\pi$ Multiple Bonding

Small size enables strong lateral overlap of p-orbitals, a trait missing in heavier elements.

The Mechanism



The Evidence

Self-Bonding



Self-Bonding



Cross-Bonding



Cross-Bonding



Heavier p-block elements struggle to form stable $p\pi-p\pi$ bonds due to large, diffuse atomic orbitals.

JEE Trap: Blindly Applying Group Trends

Test setters exploit the anomalies of Period 2 to bait incorrect assumptions.

Premise:

Since Aluminum forms $[\text{AlF}_6]^{3-}$,
Boron must form $[\text{BF}_6]^{3-}$.



Correction:

Boron lacks d-orbitals. Its maximum
covalency is rigidly locked at 4.



Rank-Saver Insight: Always treat Li, Be, B, C, N, O, and F as exceptions first. Verify max covalency and check for anomalous covalent character before predicting their compounds.



You've Learned the Theory.

Now Let's Test It.

Reading notes gets you knowledge.

Practicing MCQs gets you marks.

That's exactly what TopAll Pro is built for.

Try TopAll Pro Now

What TopAll Pro Does Differently

-  **Stuck? Snap it. Solve it. — Doubts AI**
Photo → step-by-step solution in seconds, 24/7
-  **Your AI Coach finds your blind spots**
Concept-level weakness detection — not just chapter-level
-  **4.5 Lakh+ questions. Never run out.**
13× more content than any other prep app in India
-  **Build your own test in 60 seconds**
Pick a chapter, set difficulty — AI does the rest instantly.
-  **AI Recommendation that helps you improve**
AI Recommendation Analysis your Tests and tell you where you need to improve.



Practice the moment you finish studying
Jump in while the concept is still fresh in your head

4.5L+
MCQs

1.5L+
Students

AI Powered
In-Depth Analysis