

Why Properties Repeat Predictably

Unlocking the mechanical rules of the Periodic Table





Moving left to right across a Period.

- Adding electrons to the same principal energy level. Effective nuclear charge increases.



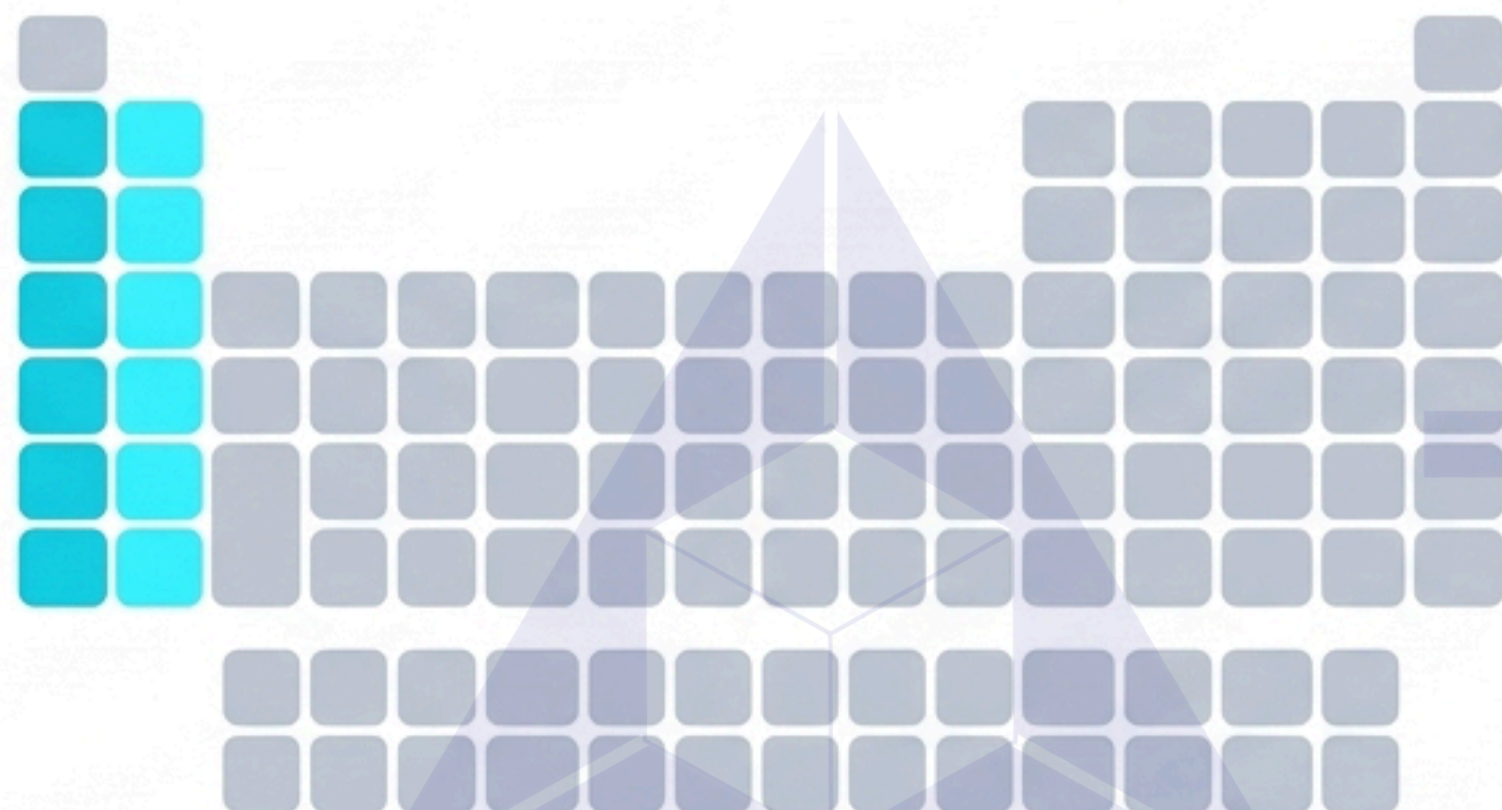
Moving top to bottom down a Group.

- Adding entirely new energy levels. Expanding the atomic footprint and increasing shielding.



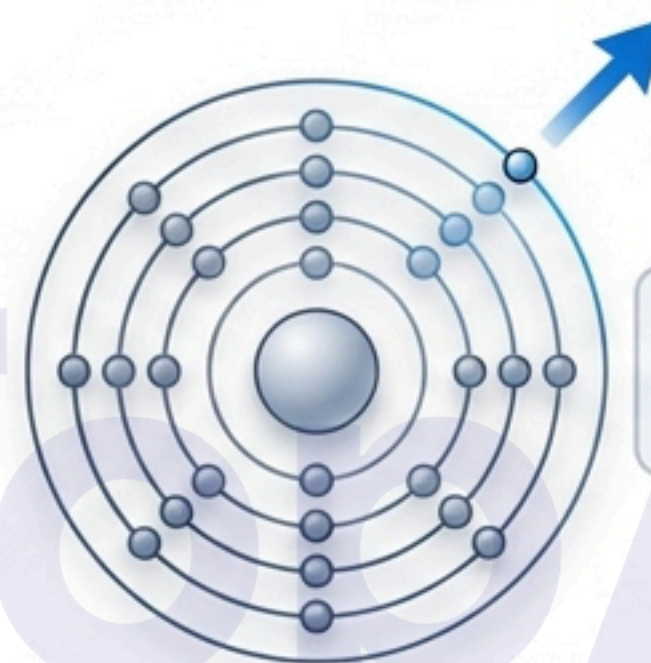
Periodicity is not a coincidence. It is the direct physical consequence of electron configuration repeating at regular intervals.

The Electron Donors: Group 1 Alkali Metals

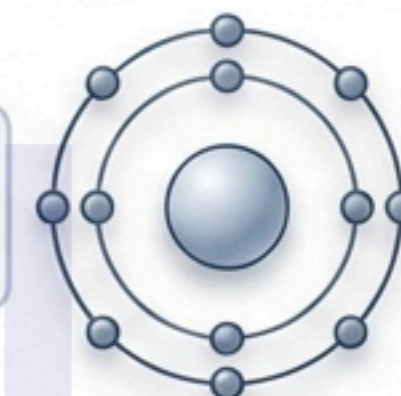


- Largest atomic radii in their period.
- Lowest ionization enthalpies.

Before/After



After



Stable Cation



Possess only one electron in the outermost shell.
Removing it creates a highly stable, noble-gas core.



Reactivity increases down the group. Valence electrons get further from the nucleus, requiring less energy to remove.



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



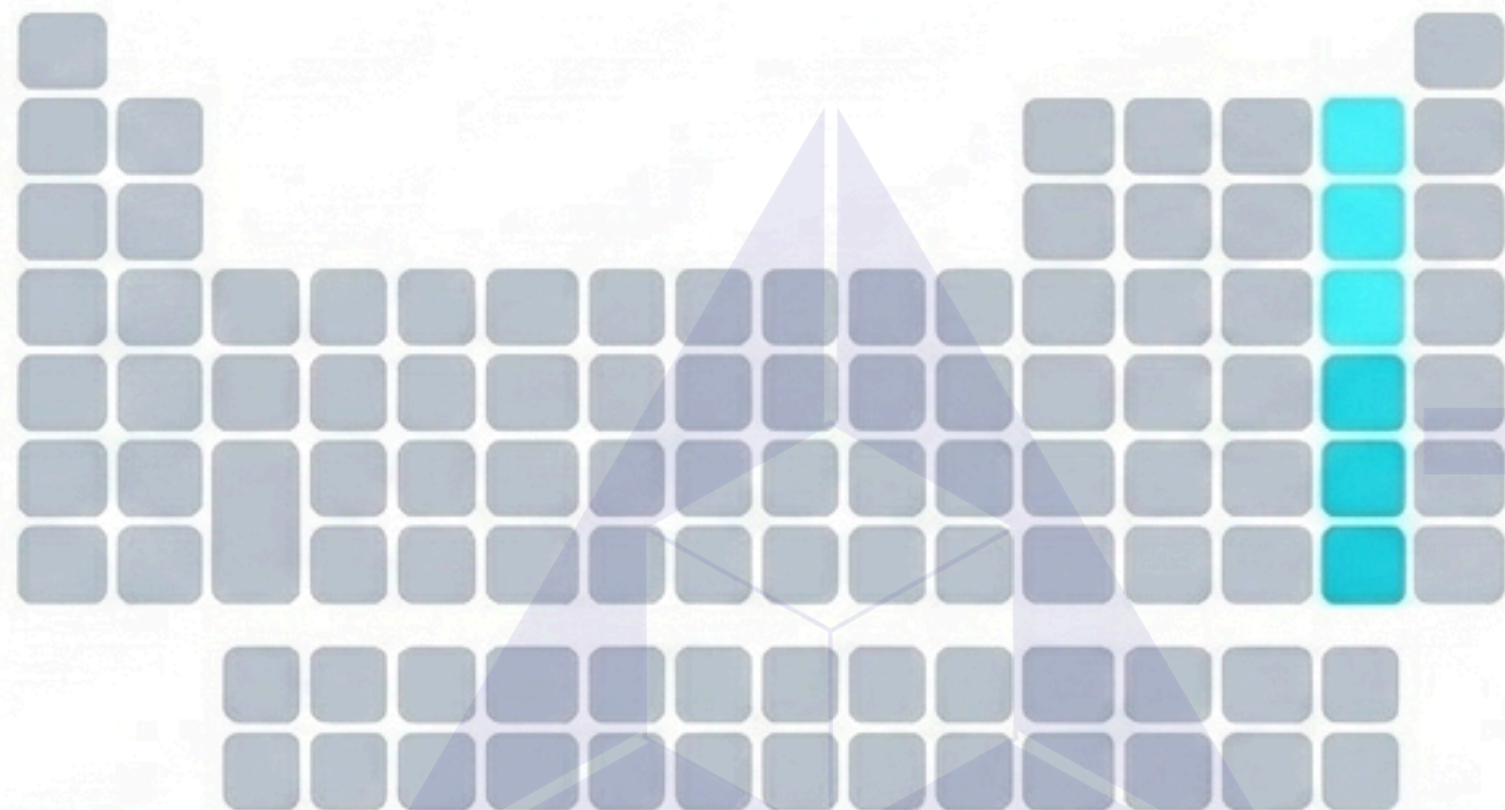
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Key Highlights

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

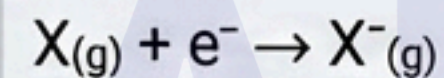
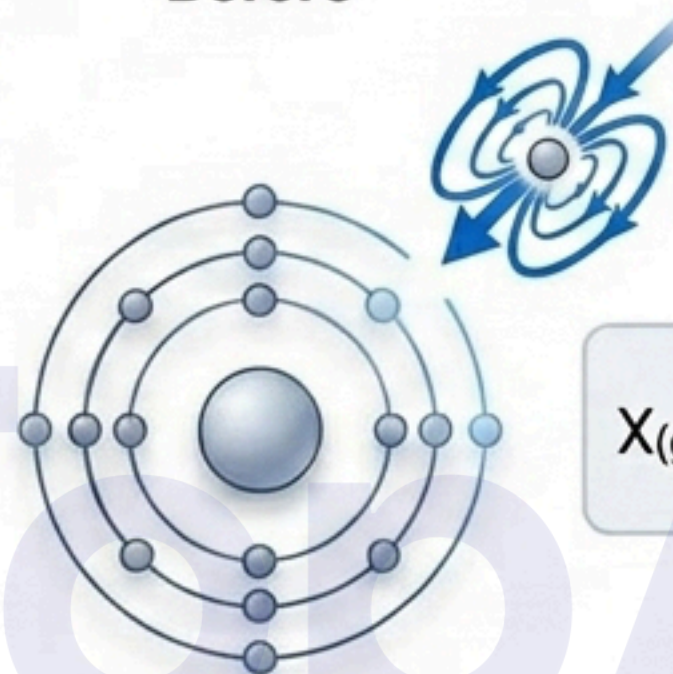


The Electron Acceptors: Group 17 Halogens

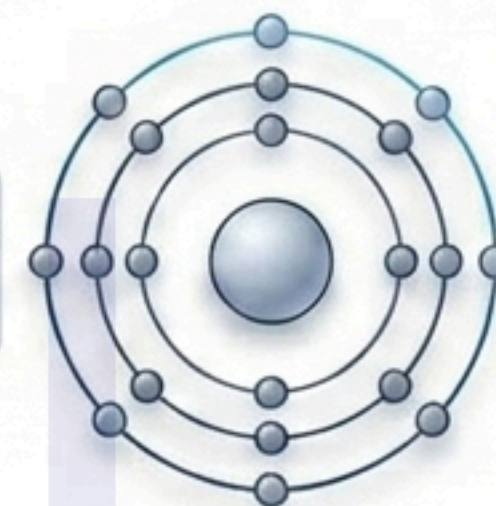


- Smallest atomic radii in their period.
- Highest electronegativity and highly negative electron gain enthalpy.

Before



After



Possess seven electrons in the outermost shell.
Exactly one electron short of a perfectly stable closed shell.



Reactivity decreases down the group. As atomic size increases, the nucleus's attractive grip on incoming outer electrons weakens.

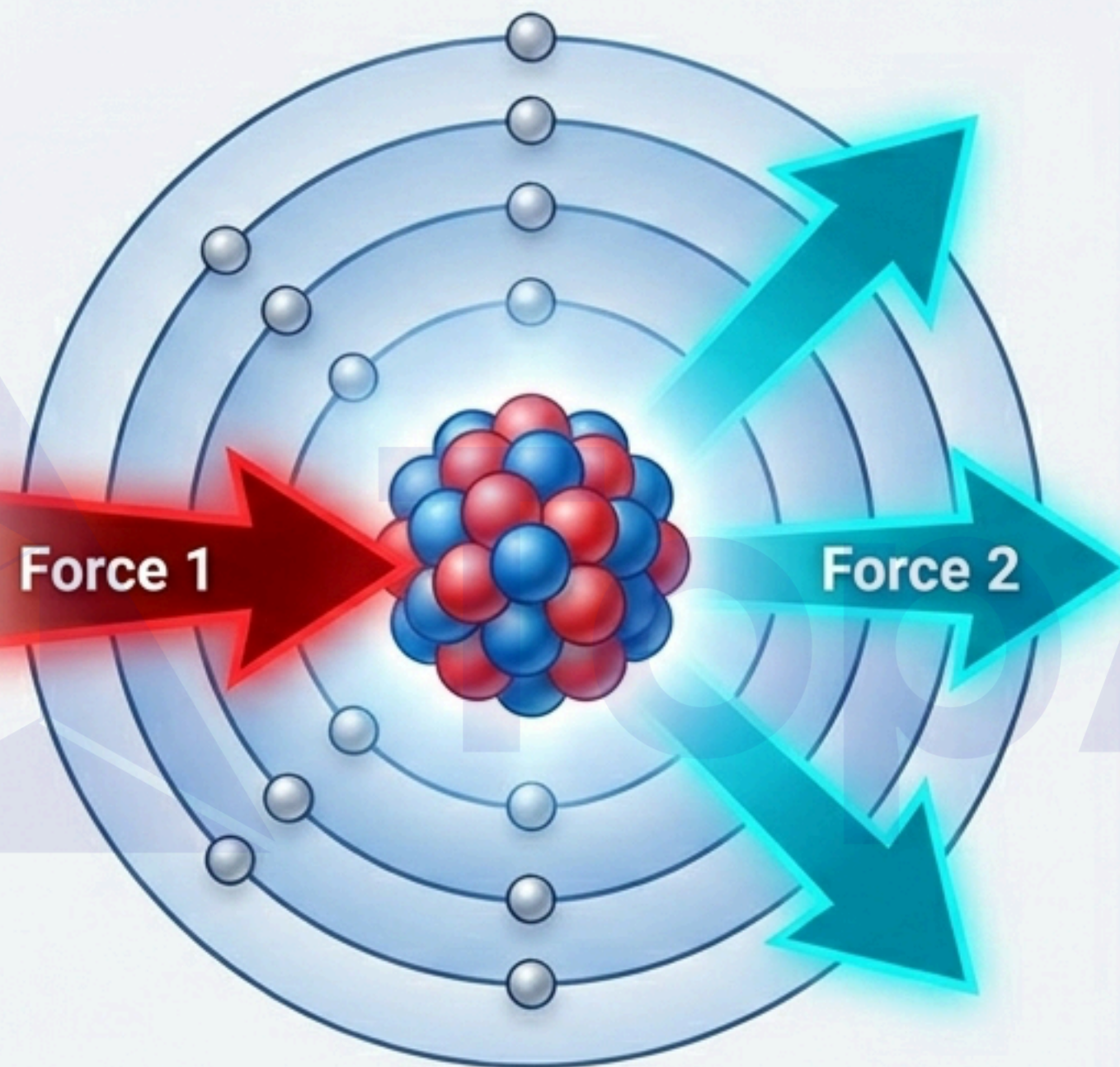
The Invisible Engine: A Sub-Atomic Tug-of-War

Force 1: Effective Nuclear Charge (Z_{eff})

The inward pull of the protons in the nucleus.

Increases across a period.
Protons are added without adding new shielding shells, tightening the atom.

Force 1



Force 2

Force 2: The Shielding Effect

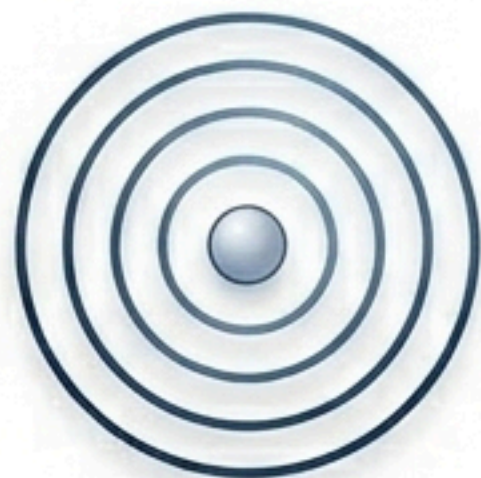
The outward push of inner core electrons repelling outer valence electrons.

Increases down a group.
Entire energy levels are added, expanding the atom.

Every single periodic trend is simply a measurement of which fundamental force is currently winning.

The Core Properties Matrix

Atomic Radius



The physical size of the atom.

Decreases (rising Z_{eff})

Increases (new shells)

Ionization Enthalpy

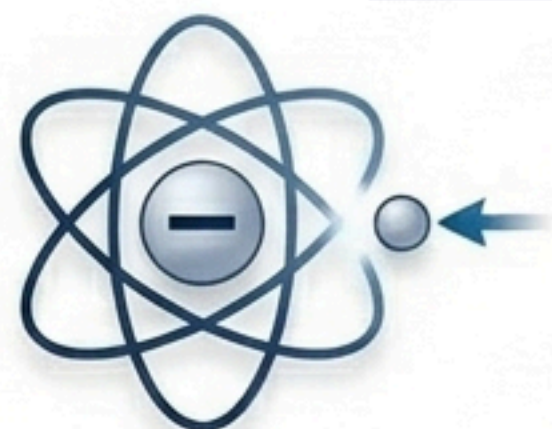


Energy required to remove an electron. Always positive.

Increases (tighter grip)

Decreases (looser grip)

Electron Gain Enthalpy

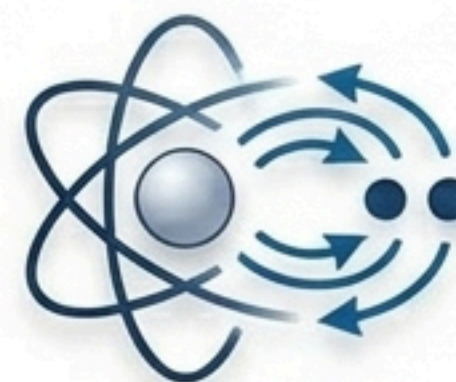


Energy change when an electron is added.

More negative (easier to add)

Less negative
(harder to add)

Electronegativity



The ability of an atom to attract shared electrons in a bond.

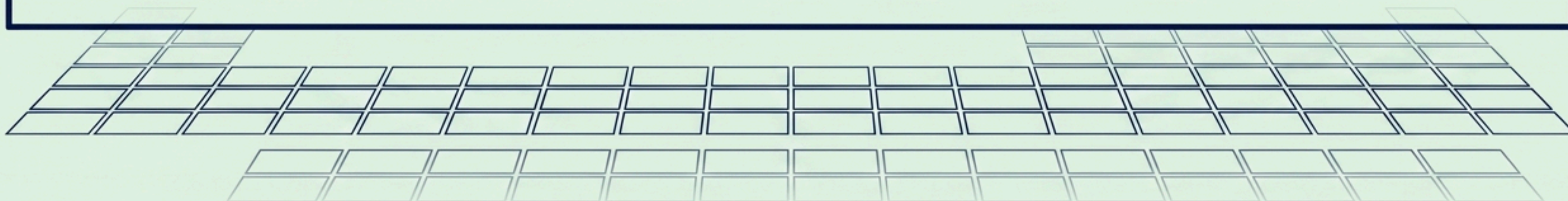
Increases
(peaks at Fluorine: 4.0)

Decreases

The Universal Rule of Periodicity

Physical and chemical properties are not random; they are a direct, physical manifestation of an element's outermost electron configuration.

The periodic table is a continuous map of metallic to non-metallic character. The left extreme reacts by losing electrons to the nucleus; the right extreme reacts by gaining electrons for the nucleus. Understanding the atomic radius unlocks the rest.





You've Learned the Theory.

Now Let's Test It.

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