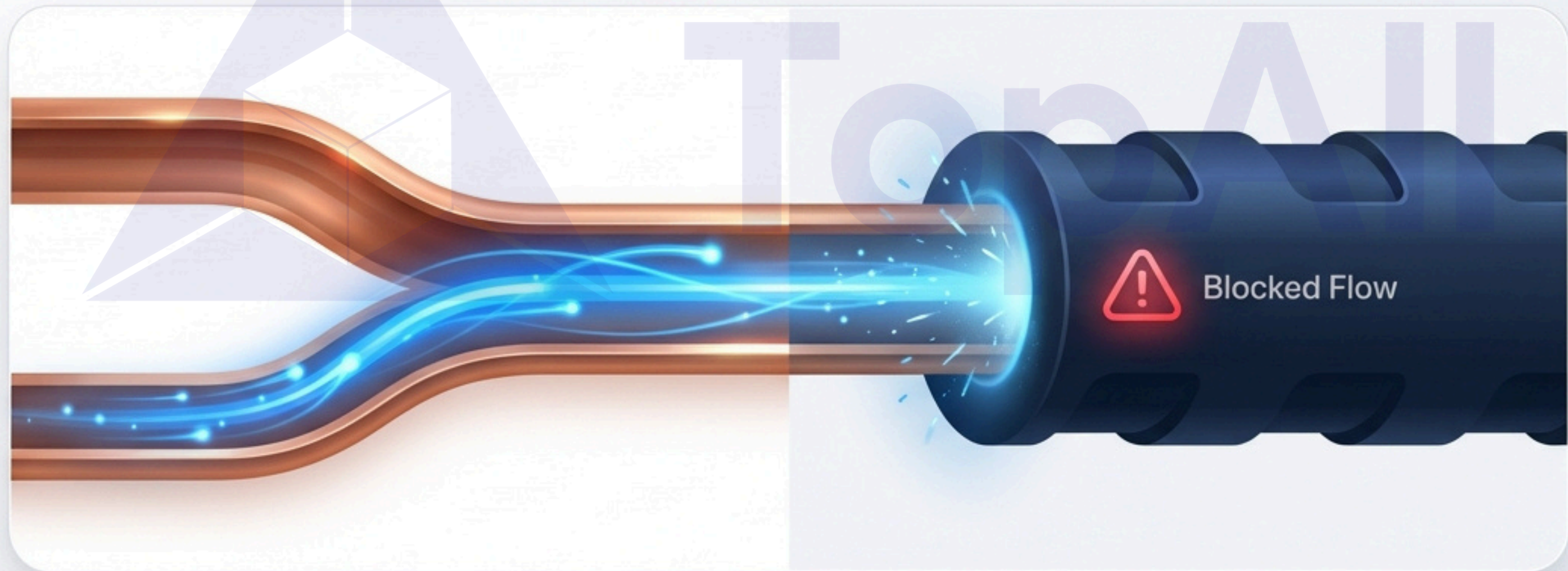


Conductors and Insulators

Why charge moves easily in some materials but not in others



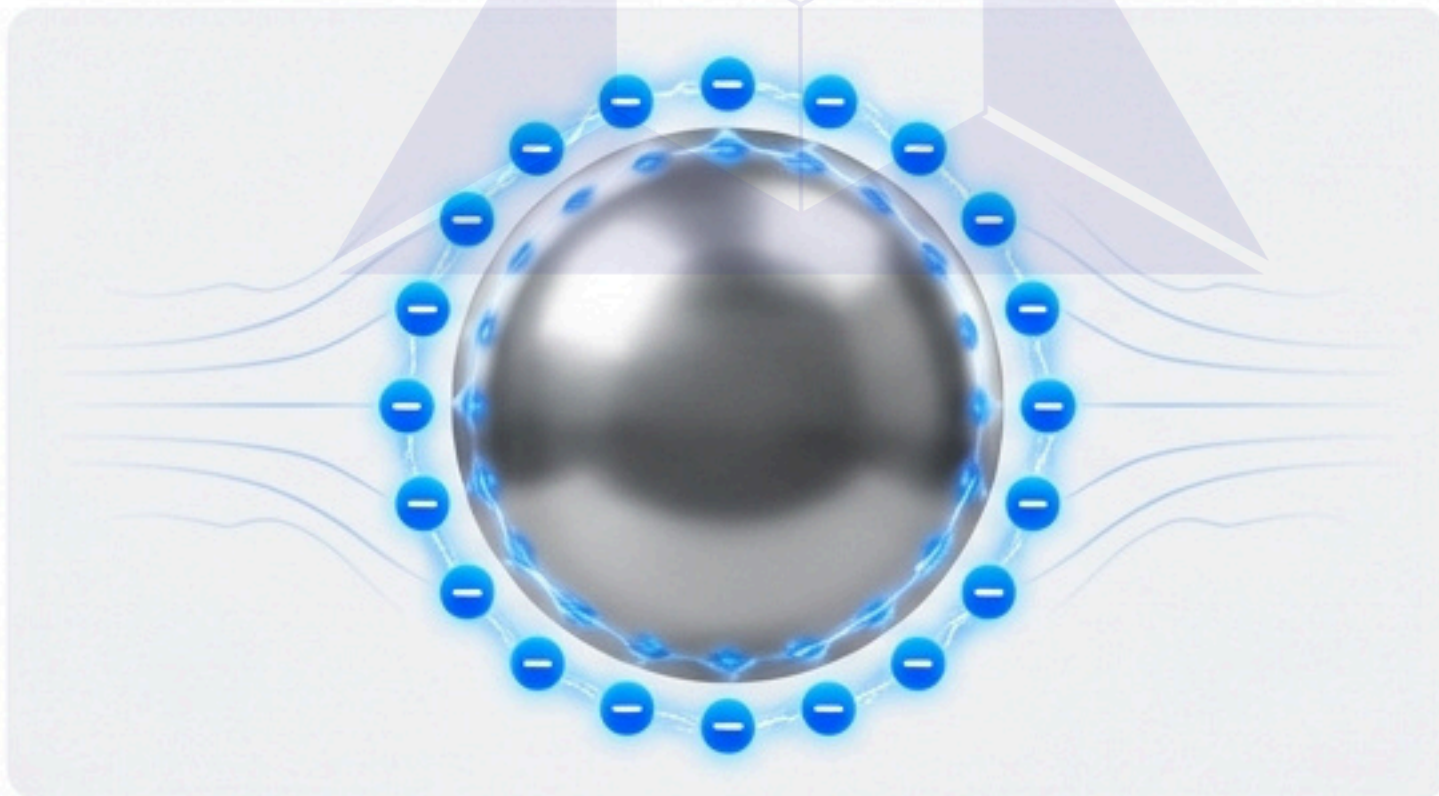
The Core Difference

How materials respond to electric charge.

Allow Charge to Flow

Charges are comparatively free to move inside the material.

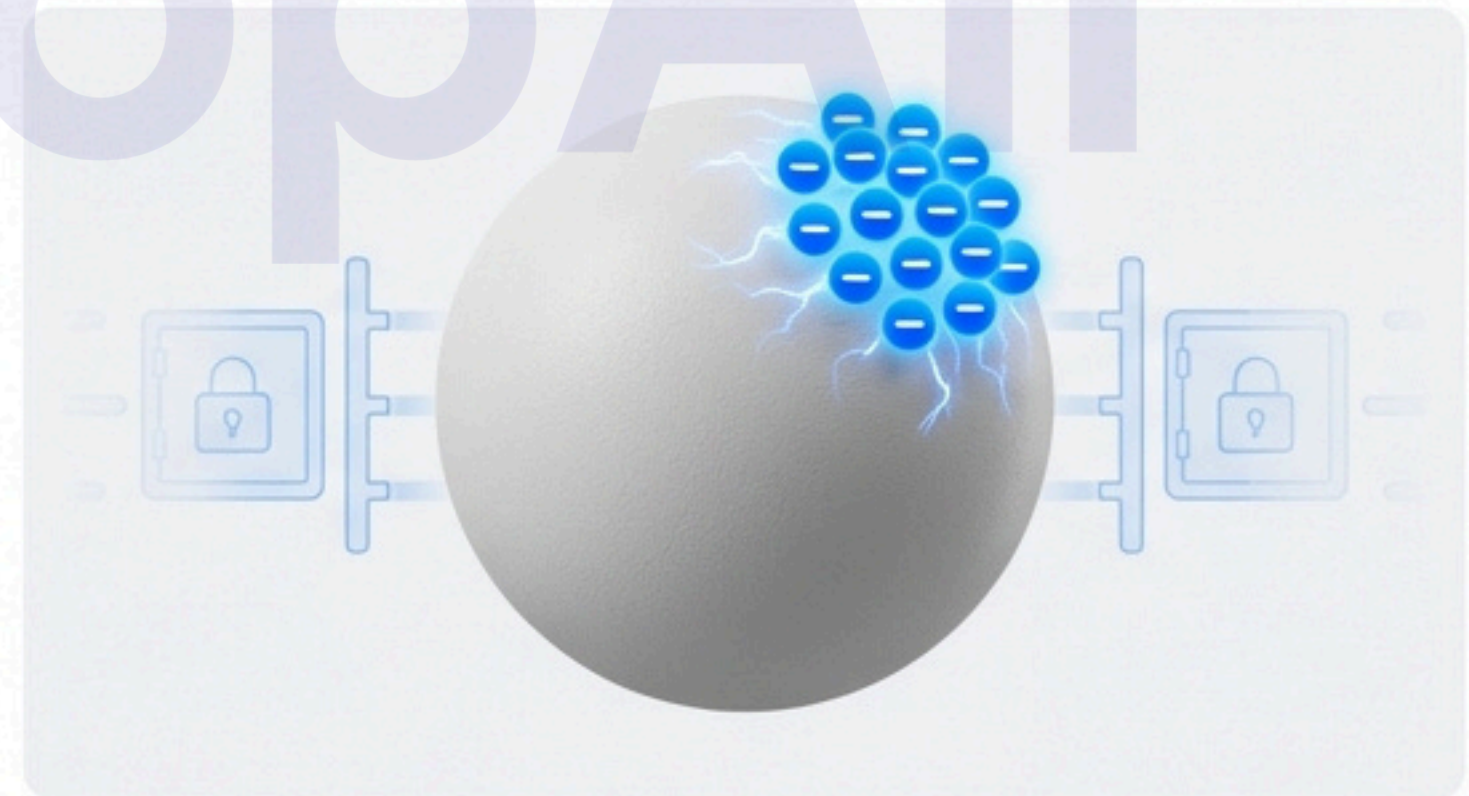
- Behavior: When charge is transferred, it instantly distributes over the entire surface.



Block Charge Flow

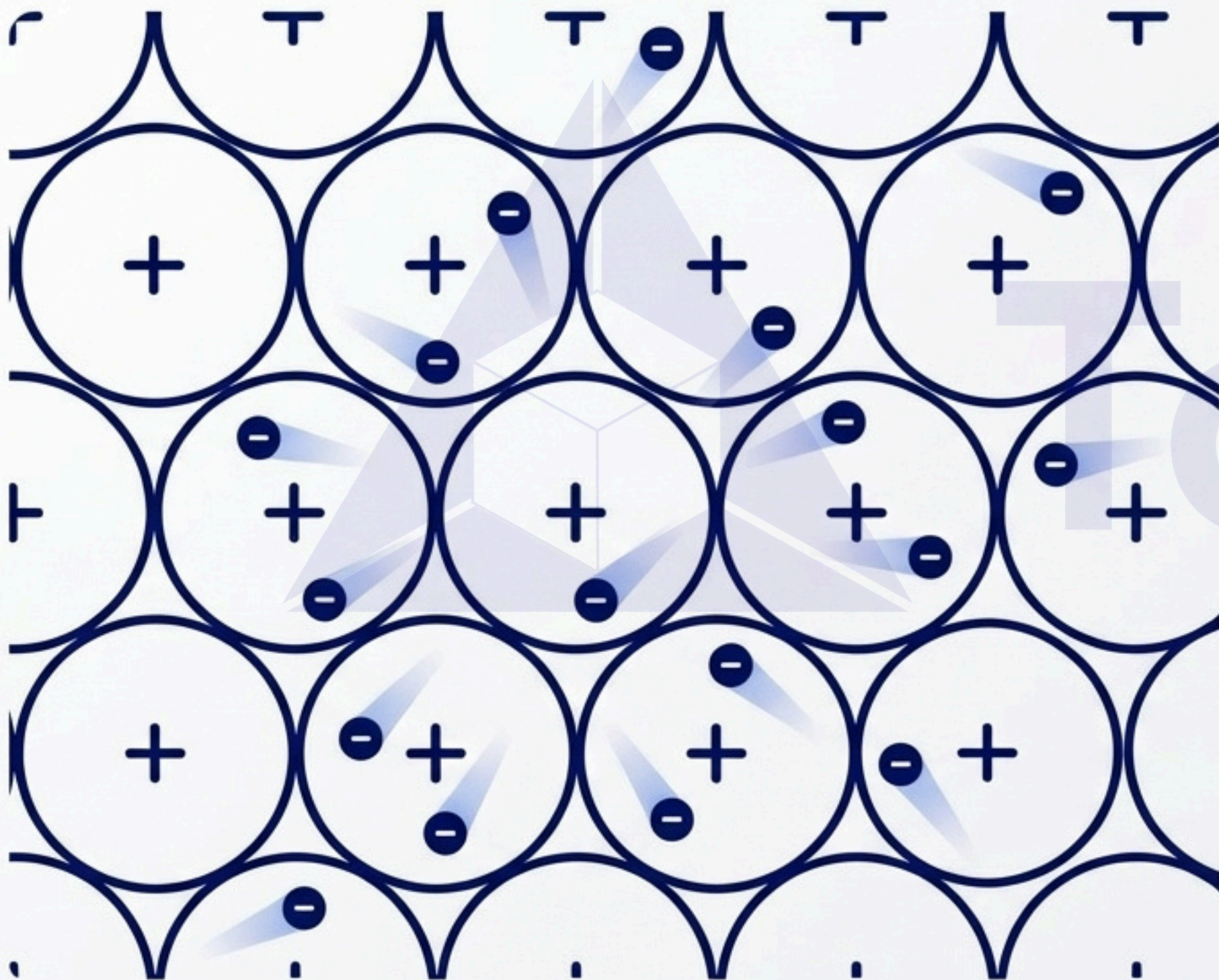
Offer high resistance to the passage of electricity.

- Behavior: When charge is put on an insulator, it stays locked in exactly the same place.



Inside a Metal Conductor

Why do metals conduct so well? It comes down to atomic structure.



The Sea of Electrons

In solid metals, outer electrons are loosely bound to their atoms. They detach and roam freely throughout the material lattice.

! NEET/JEE Trap

In solid metallic conductors, **ONLY** electrons move. The positive metal ions (protons/nuclei) are fixed in the lattice and do **NOT** move.



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

$$E=mc^2$$



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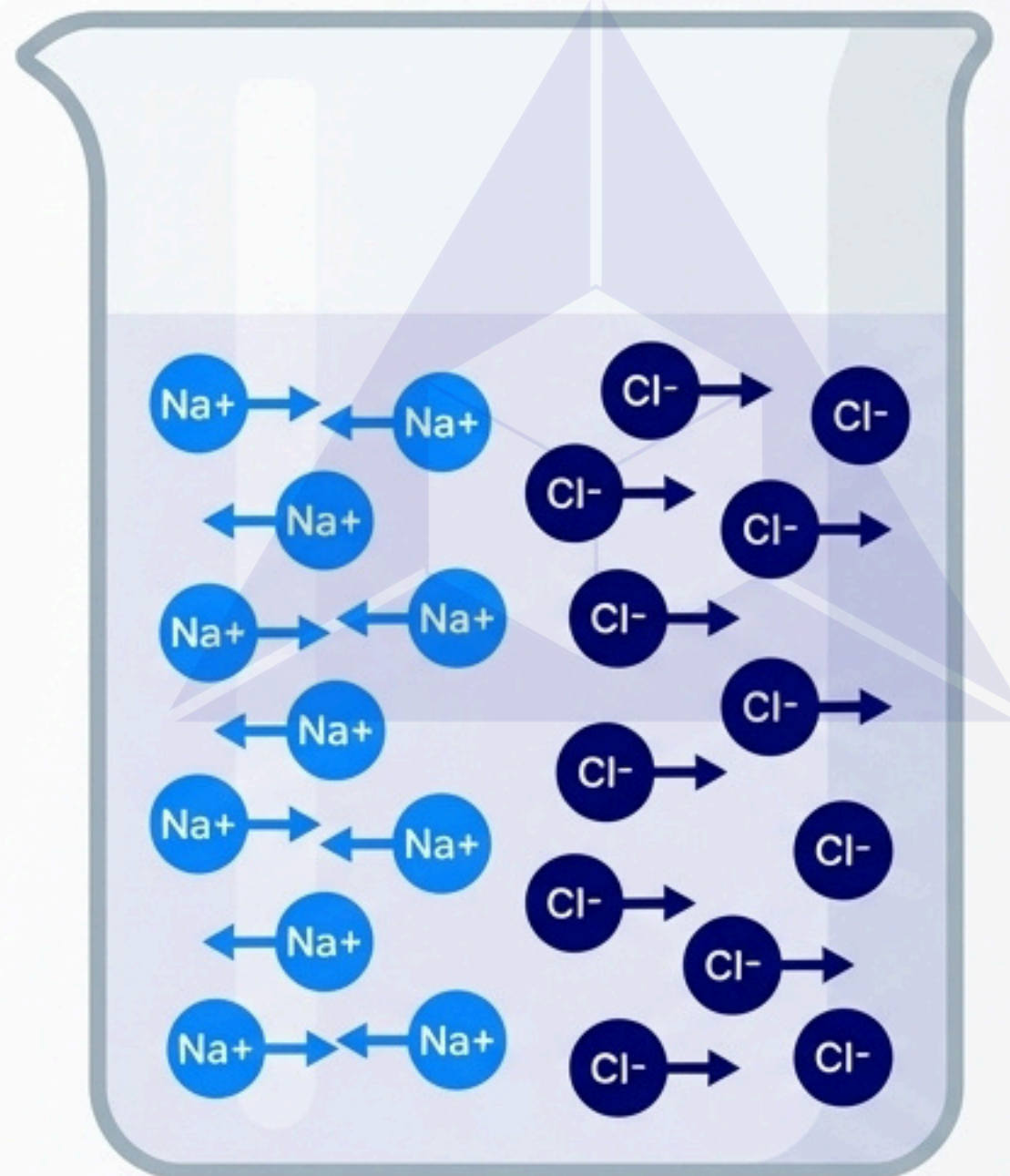
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Beyond Metals: Electrolytes

Charge carriers are not always just electrons.



Liquid Conductors

In solutions like salt water (electrolytes), the compound breaks apart into charged ions.

Two-Way Traffic

Unlike solid metals where only electrons move, in electrolytes, **BOTH** positive and negative ions are mobile and contribute to the flow of current.

Materials in the Real World

Conductors

 Copper Wire  Human Body  The Earth  Metal Spoon  Salt Solution

Insulators

 Glass  Plastic/Nylon  Wood  Porcelain

Why use a wooden handle on a metal tool?

If you rub a metal rod held by hand, the charge leaks through your conducting body to the Earth. A wooden handle (insulator) blocks this leakage, allowing the metal to stay charged.

Check Your Understanding

Key Takeaways

- Conductors allow charge flow; insulators block it.
- Charges spread out on conductors but stay localized on insulators.
- Metals = mobile electrons.
Electrolytes = mobile + and - ions.

A nylon comb gets electrified on dry hair, but a metal spoon does not. Why?

The spoon is a conductor. The charge leaks through your body to the ground.

True or False: When current flows through a copper wire, both protons and electrons move to carry the charge.

False. In solid metals, only electrons are mobile.



You've Learned the Theory.

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