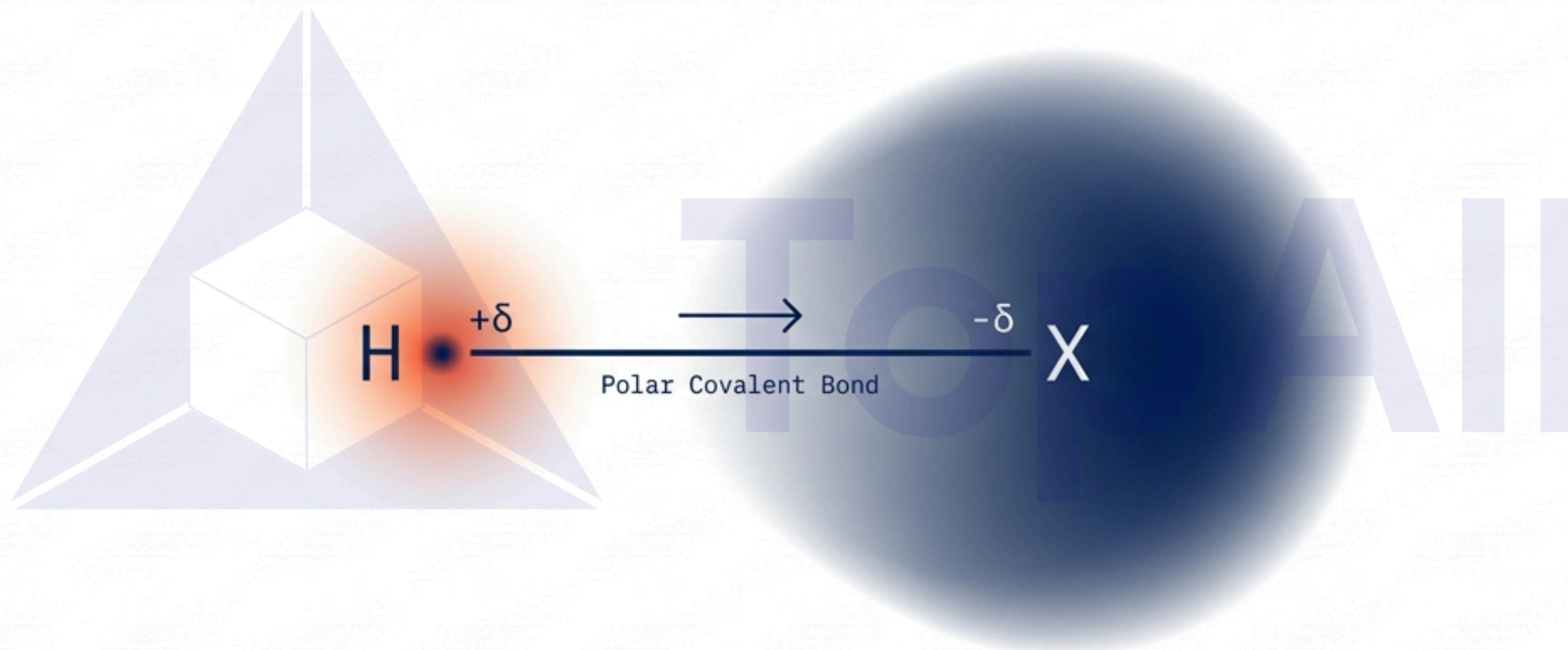


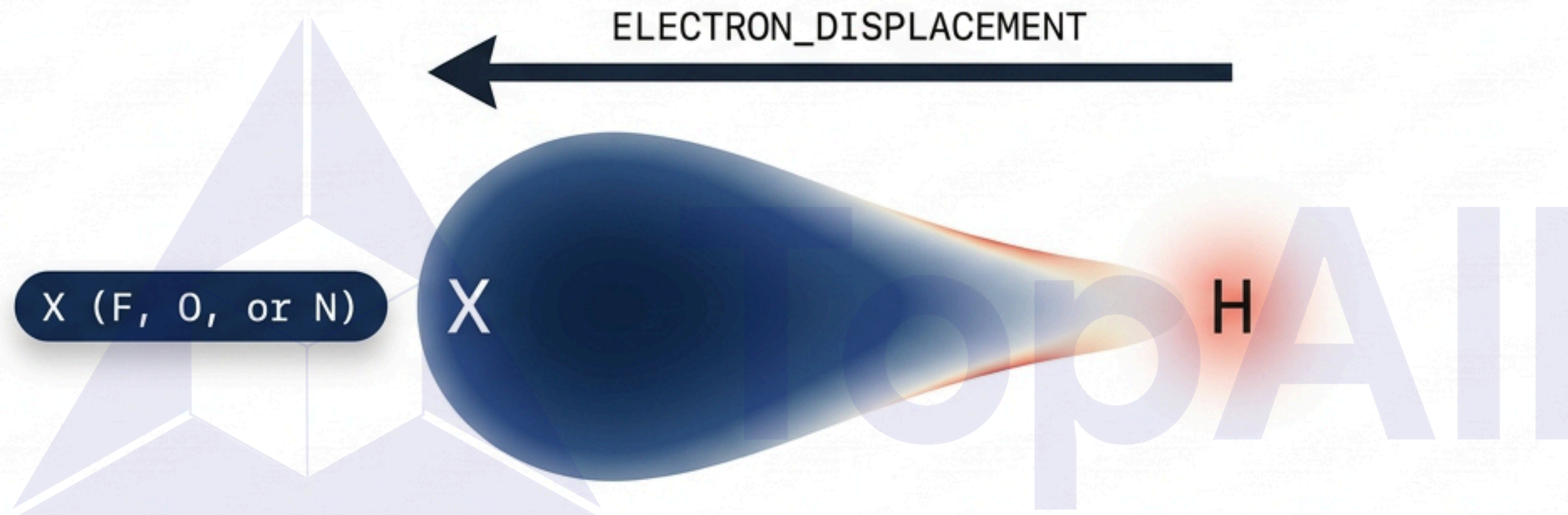
## 4.9.1 Cause of Formation of Hydrogen Bond



The Electrostatic Lens: A visual guide to intermolecular forces

The Catalyst: Electronegativity

# Electron Shift Toward Electronegative Atom



## The Mechanism

When hydrogen bonds to a strongly electronegative element X, the shared electron pair is pulled far away from the hydrogen atom.



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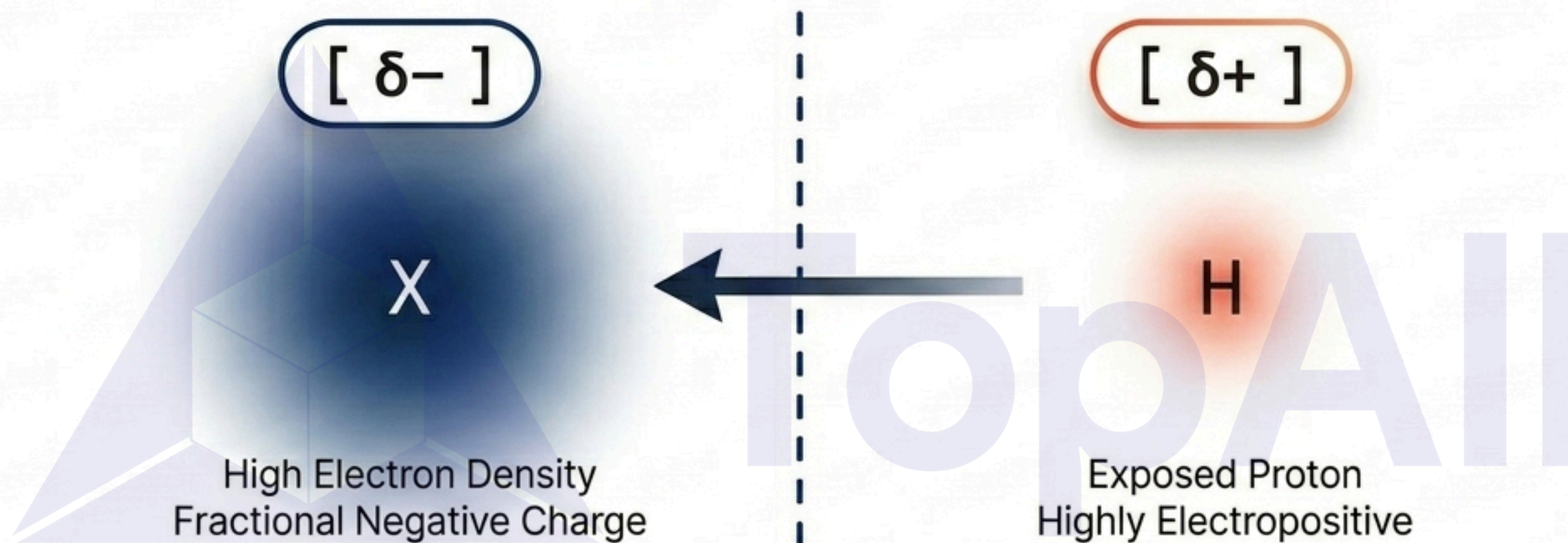
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The Result: Polarization

# Fractional Charges: $\delta+$ on H and $\delta-$ on X

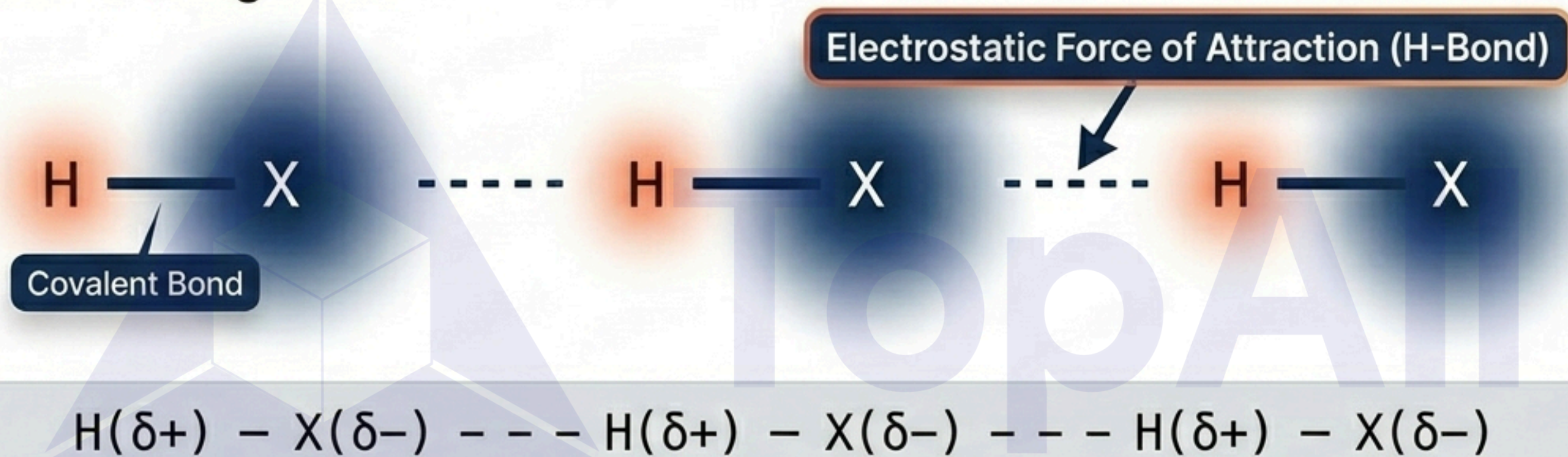


## Key-Takeaway Panel

Because of the severe electron displacement towards X, the hydrogen atom becomes highly electropositive, acquiring a fractional positive charge ( $\delta+$ ).

# Why This Creates Intermolecular Attraction

## Multi-Molecule Alignment

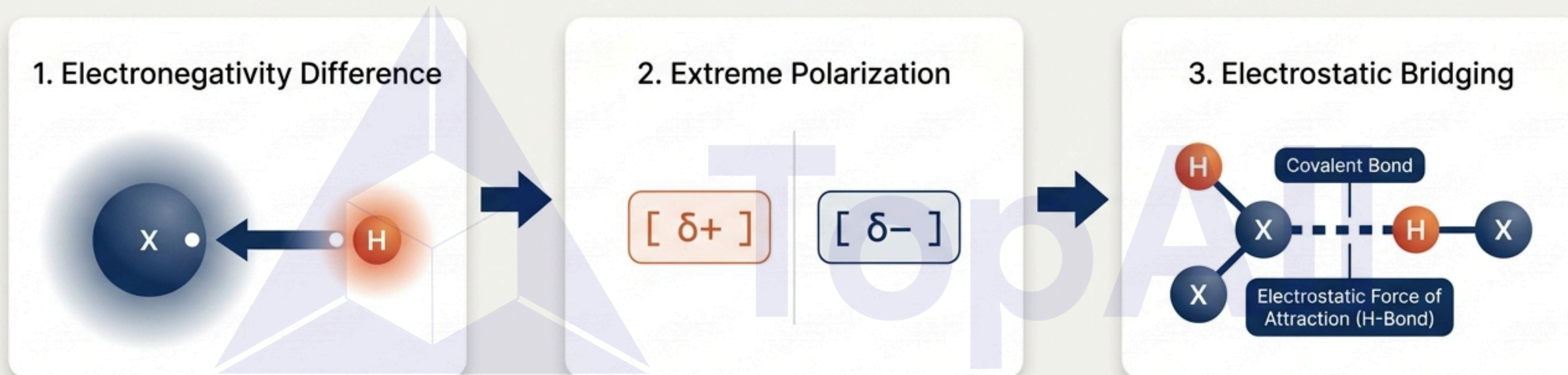


## The Mechanism

The hydrogen bond acts as an electrostatic bridge between two atoms, holding one by a covalent bond (solid line) and the other by a hydrogen bond (dotted line).

# Final Recap: The Causal Chain of H-Bonding

## Synthesis Flowchart



## Core Takeaway Panel

### Core Principle

The hydrogen bond forms because strongly polarized H becomes highly electropositive, allowing it to act as an electrostatic bridge to adjacent electronegative atoms.



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