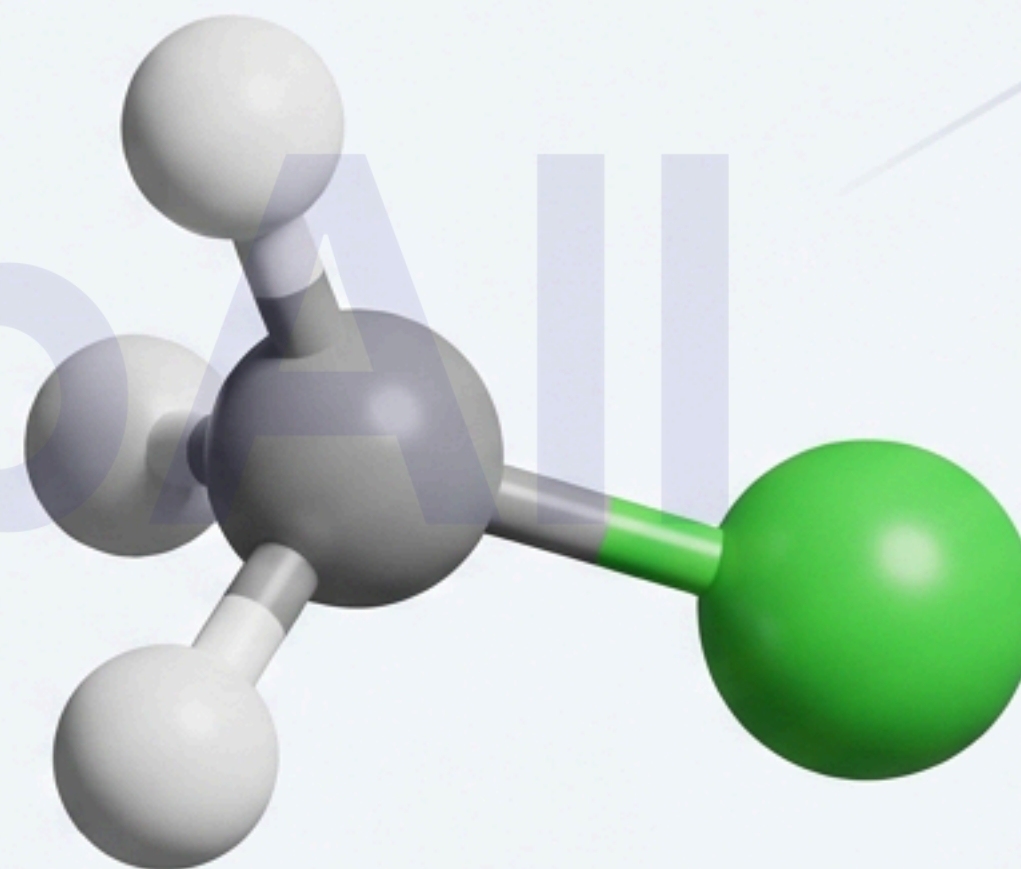


Physical Properties: Boiling Point, Solubility and Density

A visual reference guide to the macroscopic and microscopic behaviors of haloalkanes and haloarenes.



SENSORY PROFILE - COLOUR



In their pure state, alkyl halides are strictly colourless.

Alert: Light Sensitivity

Bromides and iodides develop distinct colors when exposed to light.

SENSORY PROFILE - SMELL



Volatile Compounds = Sweet Smell

Many volatile halogenated compounds are characterized by a noticeably sweet odor.

Key Concept: Greater Polarity + Higher Mass = Stronger Attractions



Because **halogens** are **polar** and **heavy**, their attractive forces are significantly **stronger** than their parent **hydrocarbons**.



← Increasing size, mass, and magnitude of van der Waals forces.



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



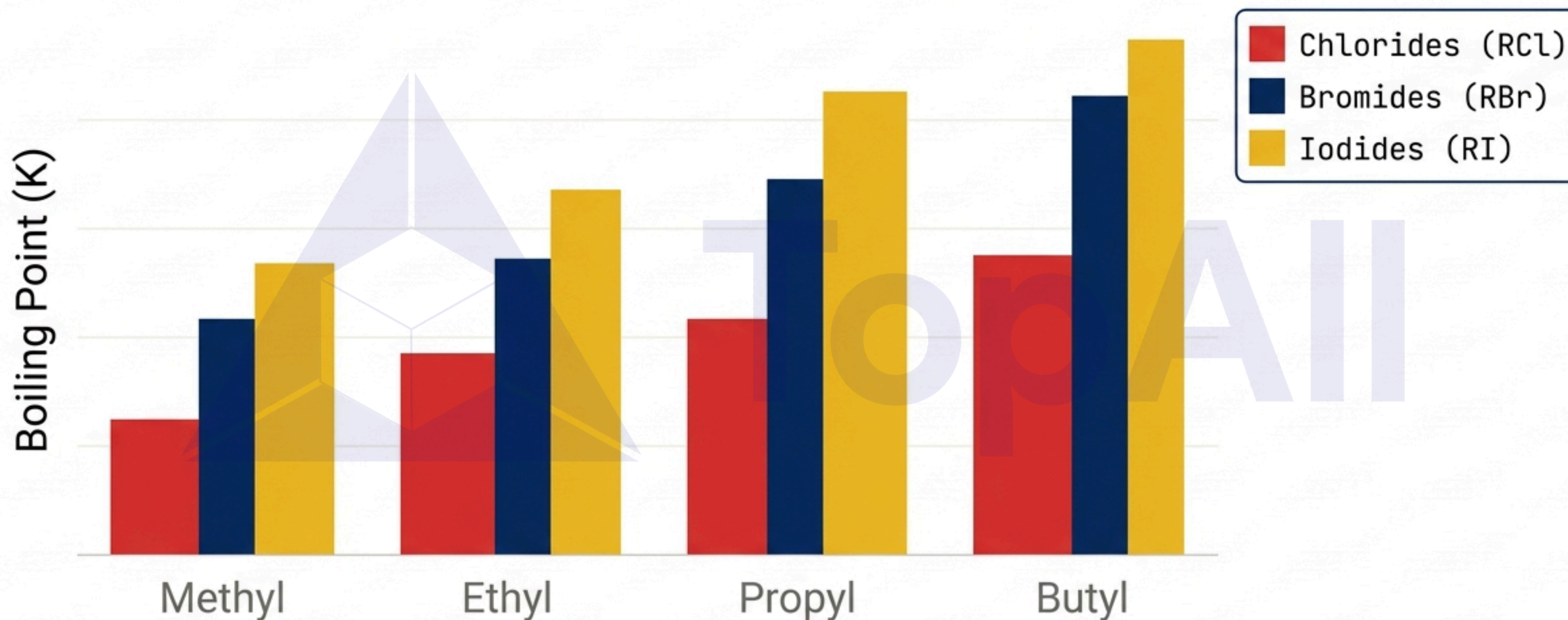
At prep.topall.app

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



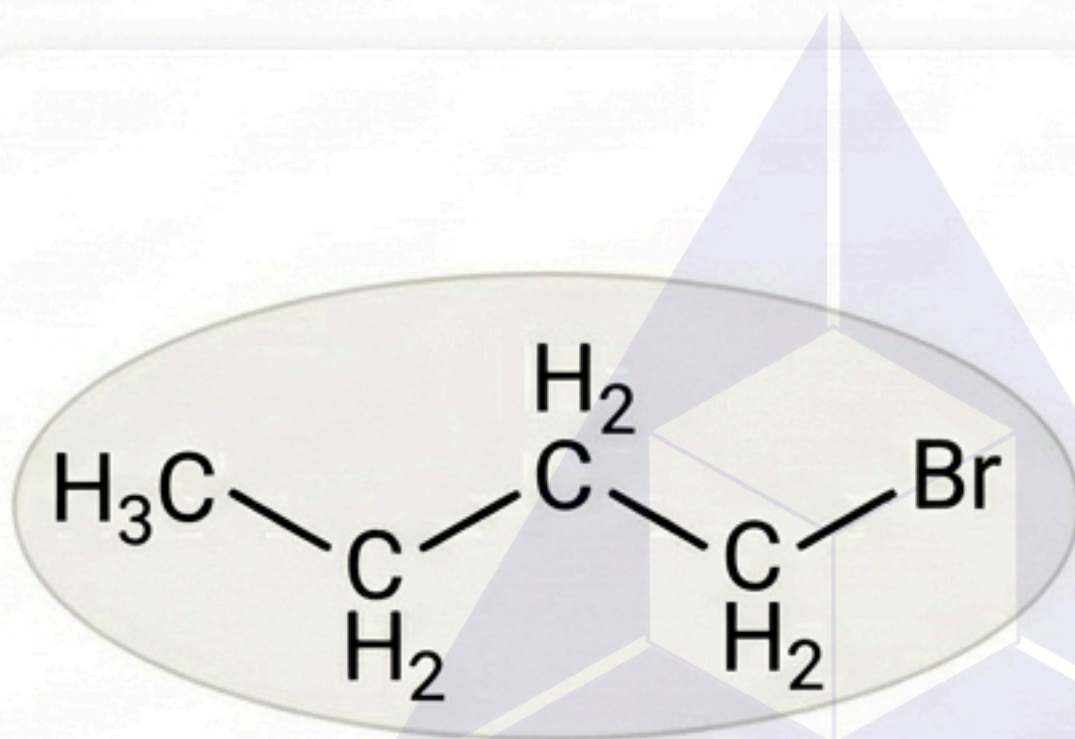
Visualizing the Data: Boiling Point Comparison



For any given alkyl group, boiling points strictly adhere to the mass-based trend.

The Branching Effect on Boiling Point

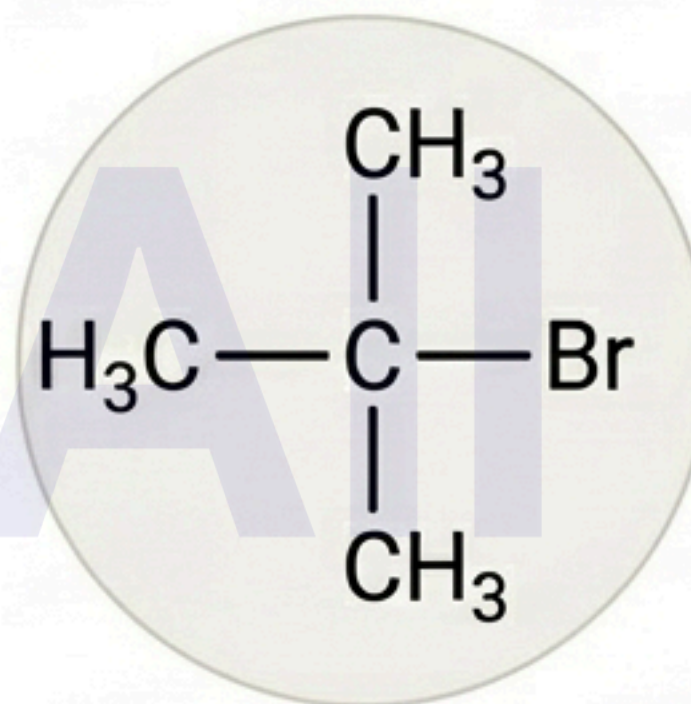
1-Bromobutane



High surface area contact =
Stronger van der Waals forces
= Higher BP.

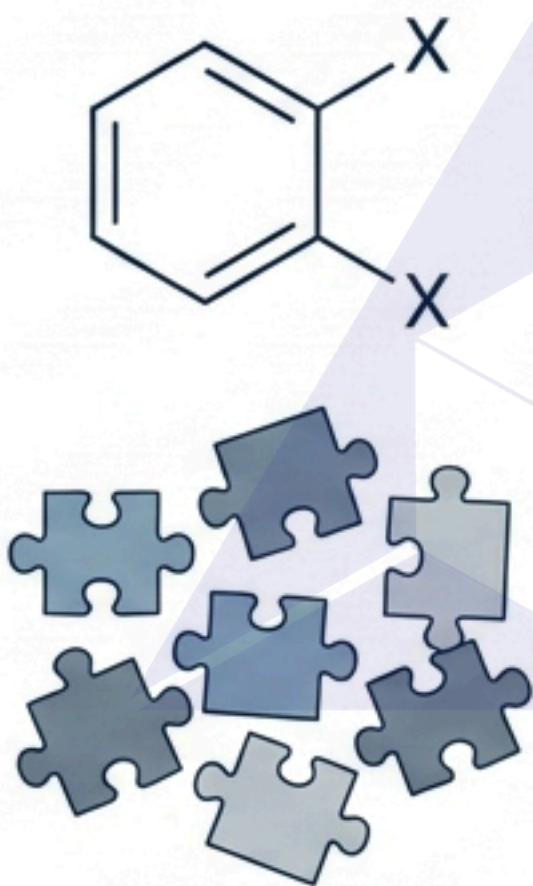
Increased
Branching
=
Decreased
Surface Area
=
Lower
Boiling Point

2-Bromo-2-methylpropane

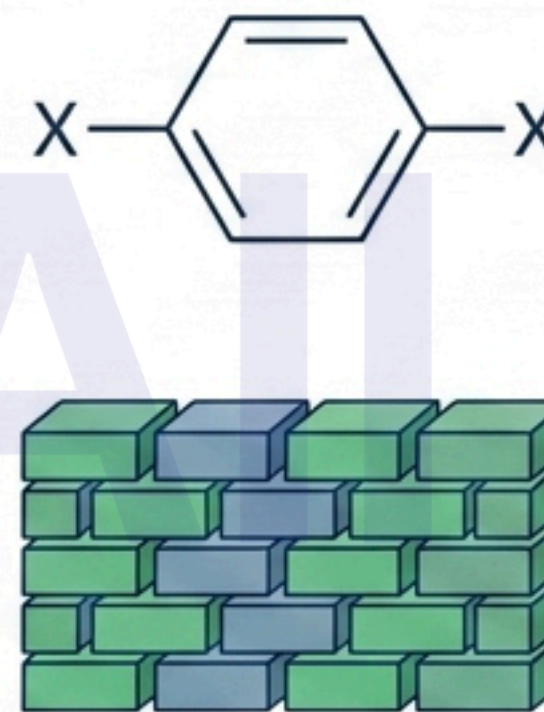
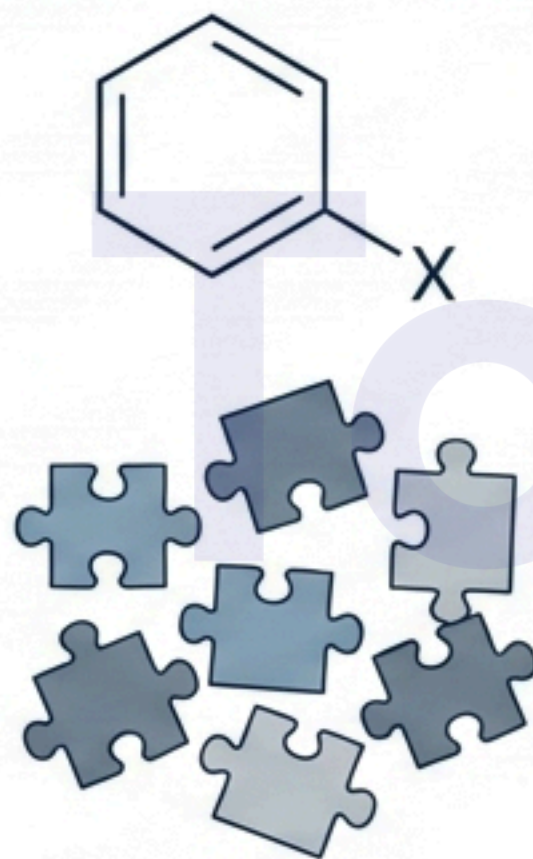


Compact, spherical shape =
Weaker intermolecular forces =
Lowest BP among its isomers.

Melting Point: The Symmetry Factor in Haloarenes



Similar boiling points, lower melting points due to poor lattice packing.



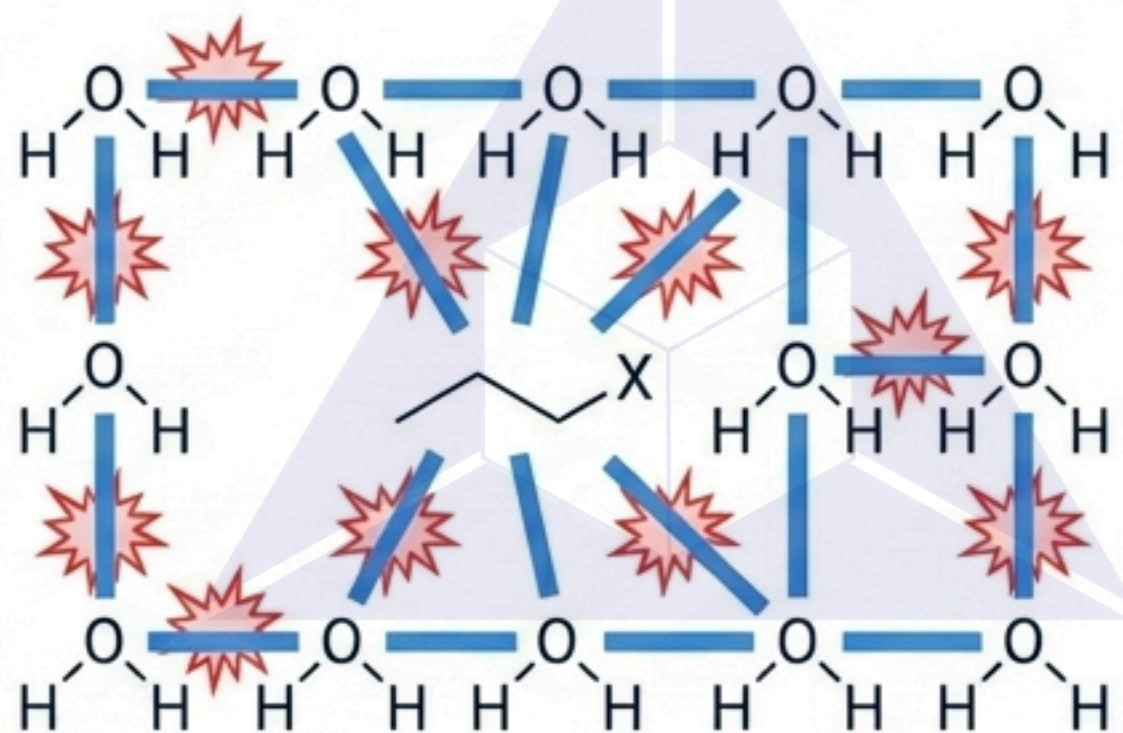
High Symmetry = Perfect Crystal Lattice Packing

The symmetry of the para-isomer allows it to fit perfectly into the solid crystal lattice, resulting in a much higher melting point.

Solubility: Water vs. Organic Solvents

Water (Aqueous)

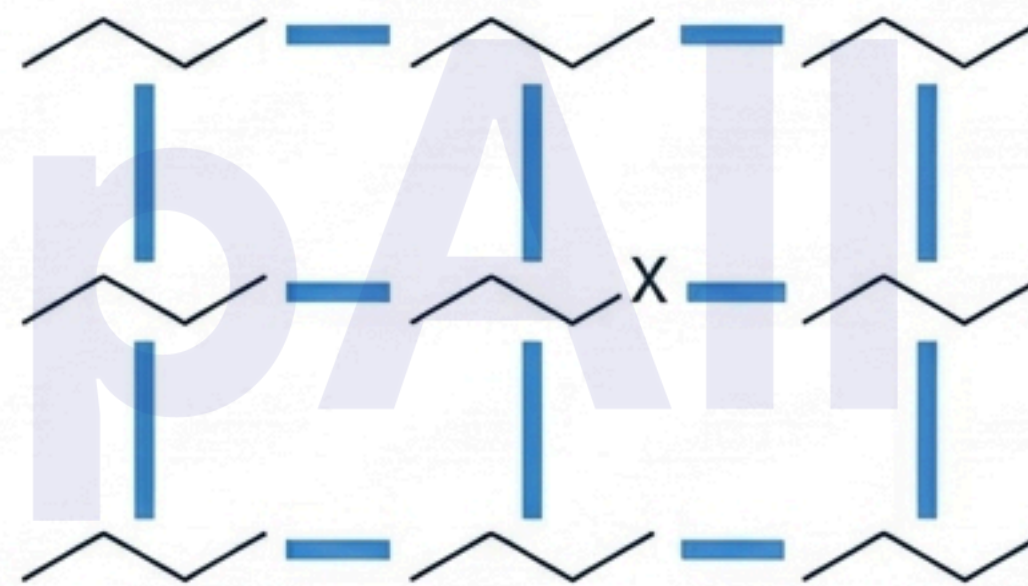
Low Solubility



Haloalkanes are very slightly soluble in water. The energy released by new, weaker attractions is less than the energy required to break the original strong hydrogen bonds between water molecules.

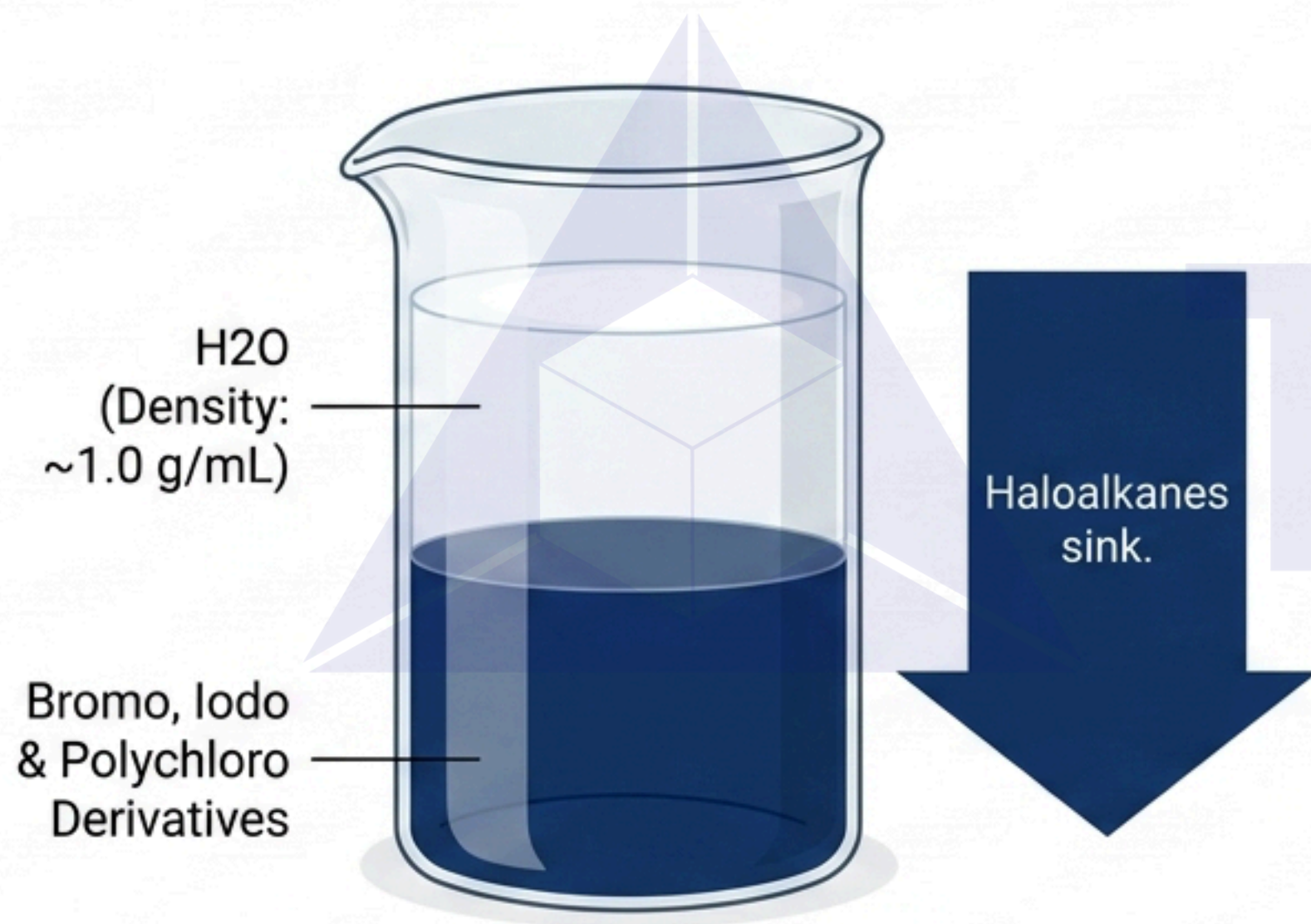
Organic Solvents

High Solubility



Haloalkanes dissolve easily. The new intermolecular attractions between haloalkanes and solvent molecules possess roughly the same thermodynamic strength as the original separate bonds.

Density Trends: The Mass Effect



Density increases with Carbon count, Halogen count, and Atomic Mass.

n-C ₃ H ₇ Cl	0.89 g/mL
n-C ₃ H ₇ Br	1.335 g/mL
n-C ₃ H ₇ I	1.747 g/mL
CH ₂ Cl ₂	1.336 g/mL
CHCl ₃	1.489 g/mL
CCl ₄	1.595 g/mL



You've Learned the Theory.

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