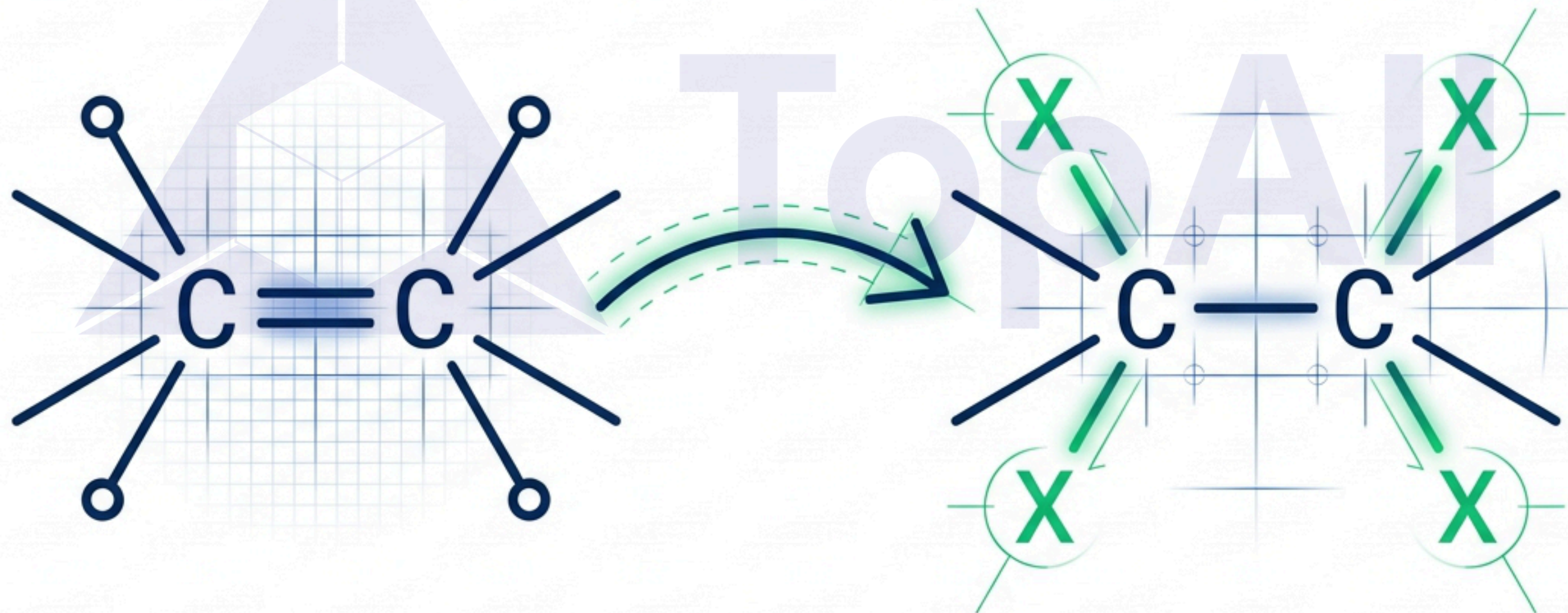


Alkenes to Haloalkanes

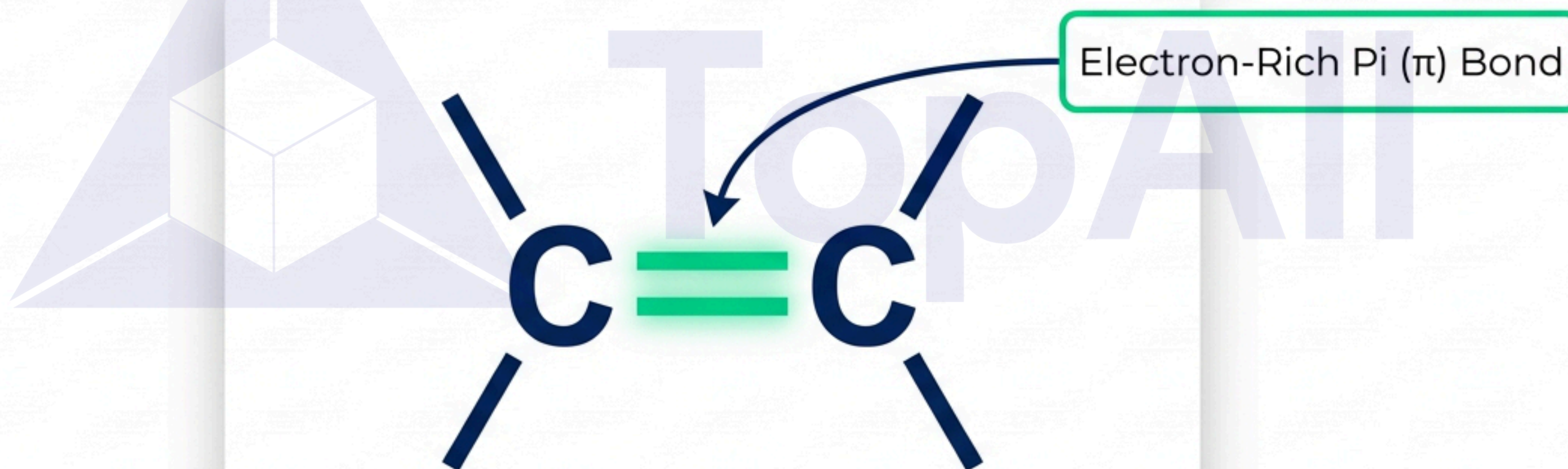
Preparation & Addition Mechanisms



The Double Bond as a Reaction Site



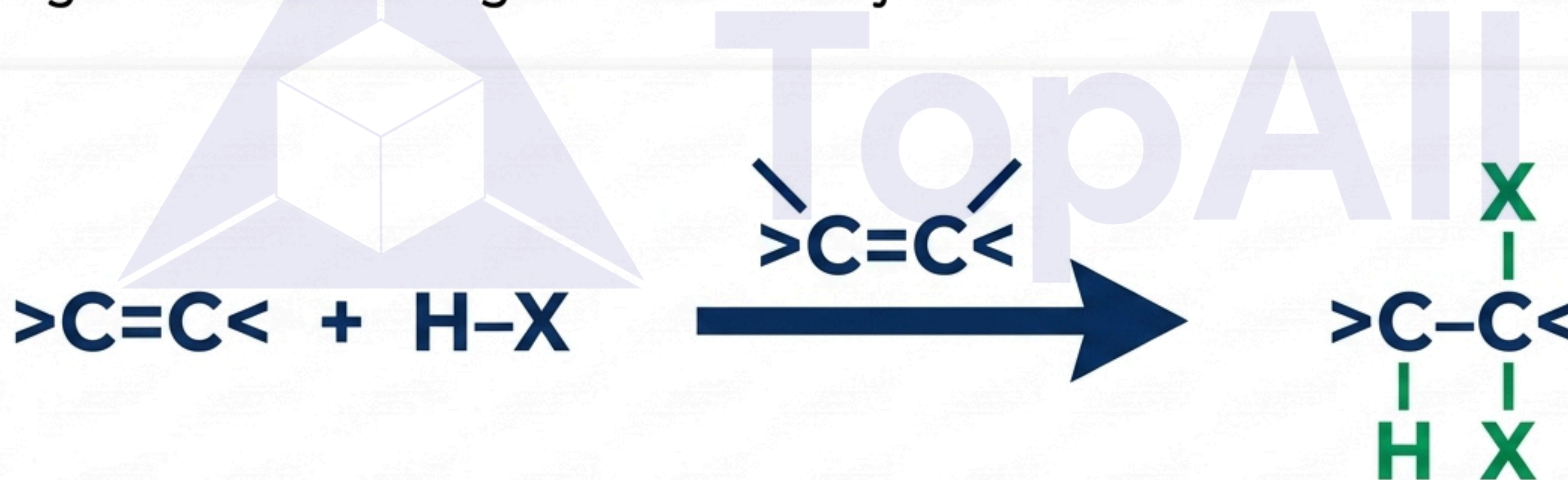
Alkenes feature an **electron-rich pi (π) bond**, making them prime targets for electrophilic addition. The carbon-carbon double bond is the engine of the transformation.



Addition of Hydrogen Halides

Reaction Type:
Electrophilic Addition

An alkene is converted to an alkyl halide by reacting with a hydrogen halide (HCl, HBr, or HI). The double bond opens, accommodating both the Hydrogen and the Halogen atom on adjacent carbons.





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Key Highlights

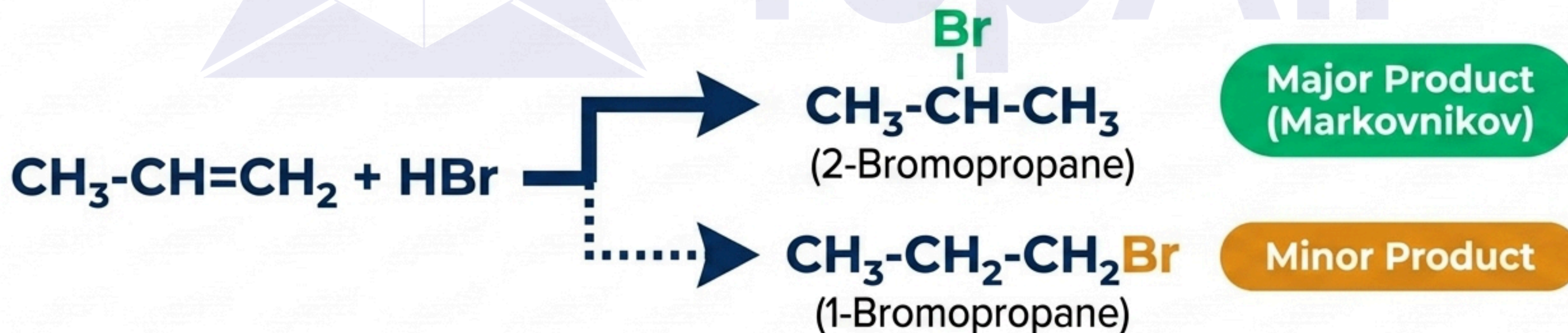
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Markovnikov's Rule

When an unsymmetrical alkene reacts with HX, the reaction yields two possible products—but only one predominates.

Rule: The negative part of the addendum (Halide) attaches to the carbon with fewer hydrogen atoms.



Addition of Bromine in CCl_4



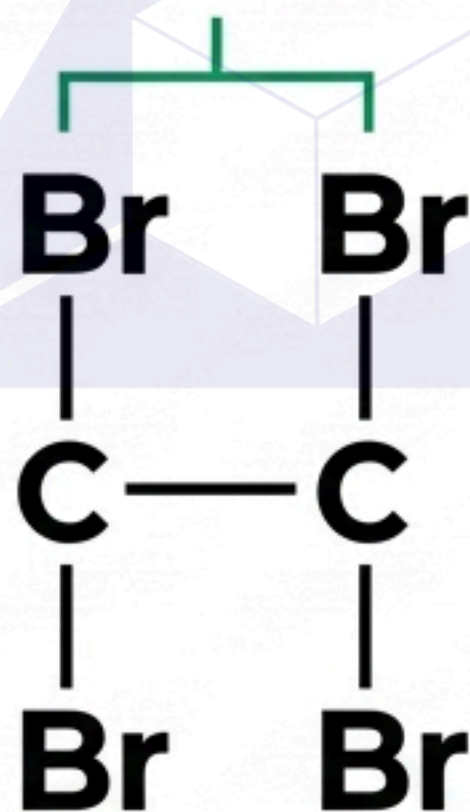
Alkenes also react directly with molecular halogens. In the laboratory, the addition of Bromine (Br_2) dissolved in Carbon Tetrachloride (CCl_4) is a standard diagnostic reaction.



Vicinal Dibromide Formation

The addition of Br_2 results exclusively in the synthesis of vic-dibromides. “Vicinal” indicates the architectural arrangement of the new halogen atoms.

Adjacent Carbons = Vicinal



Key Concept Box

**Vicinal
(vic-dihalide)**

Halogens on
adjacent carbons



**Geminal
(gem-dihalide)**

Halogens on the
same carbon



Not formed here

Double Bond Detection Summary



The Bromine addition reaction serves as a vital laboratory test for detecting carbon-carbon double bonds in an unknown molecule.

Before



Reactant: Reddish-Brown Br_2 in CCl_4



After



Product: Colorless Vic-dibromide

Discharge of color = Double bond confirmed.



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