

HOW DO WE BUILD AN ALKANE?

Hydrogenation

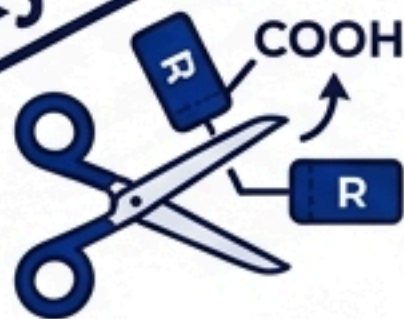


Wurtz Reaction



ALKANE

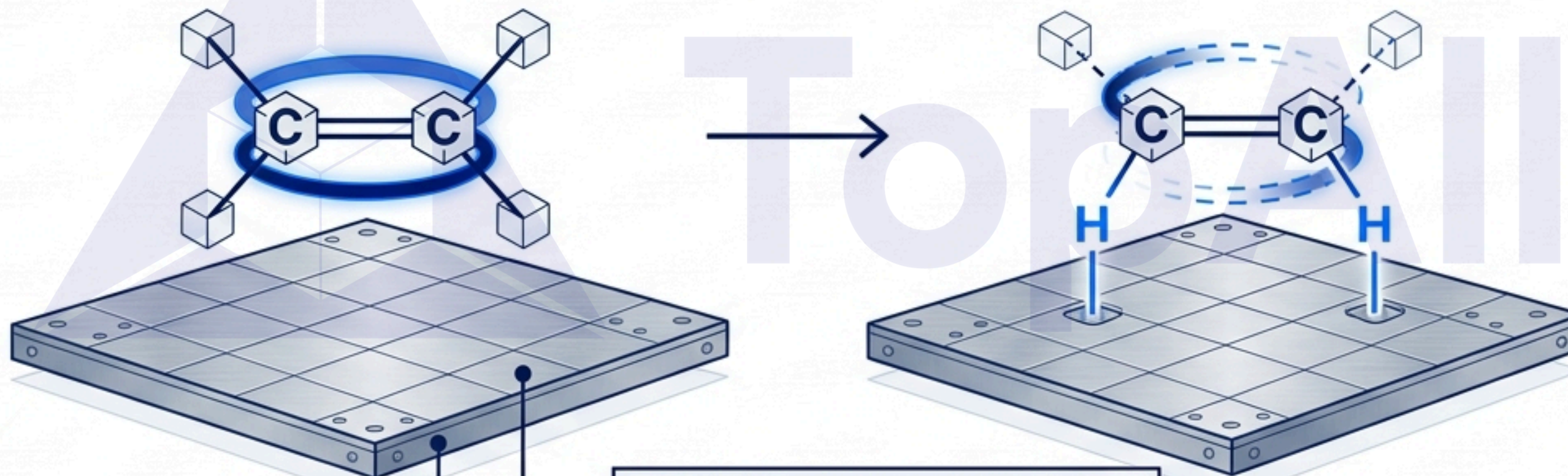
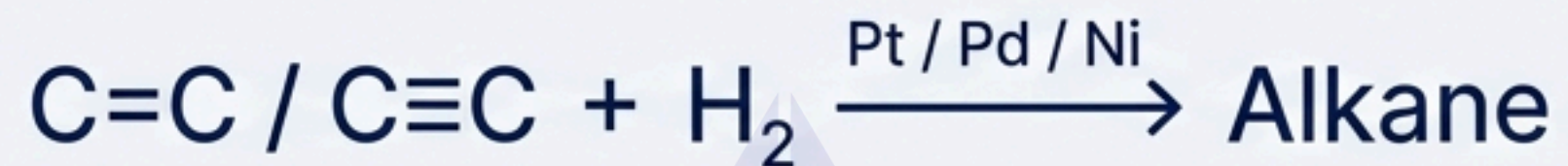
Decarboxylation



Kolbe Electrolysis



Route 1: Hydrogenation



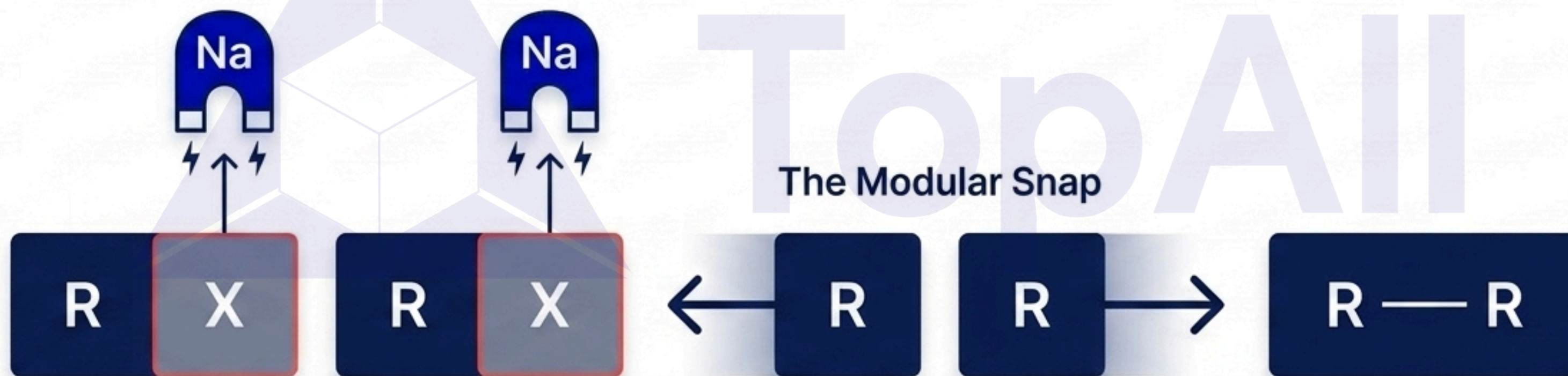
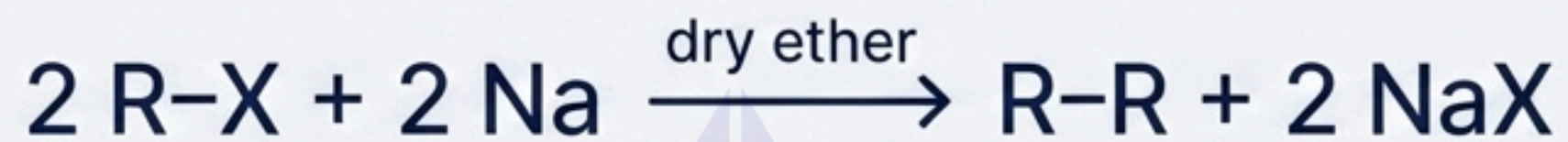
Pt / Pd / Ni Catalyst Surface

Catalyst surface adsorbs and activates the H-H bond.

Key Takeaway

Carbon Chain Math: $N \rightarrow N$
(Same carbon count)

Route 2: Wurtz Reaction



Solvent must be dry ether
(moisture reacts explosively with Na).

Success Badge

Higher symmetrical alkanes.

Key Takeaway

Carbon Chain Math: $N \rightarrow 2N$
(Carbon chains couple)



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

$$E=mc^2$$



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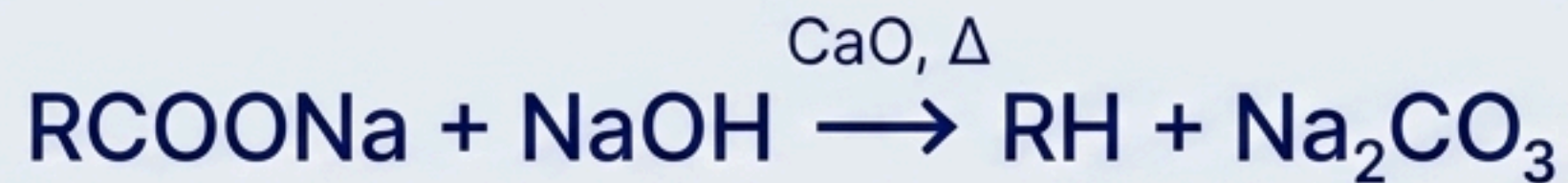
At prep.topall.app

Key Highlights

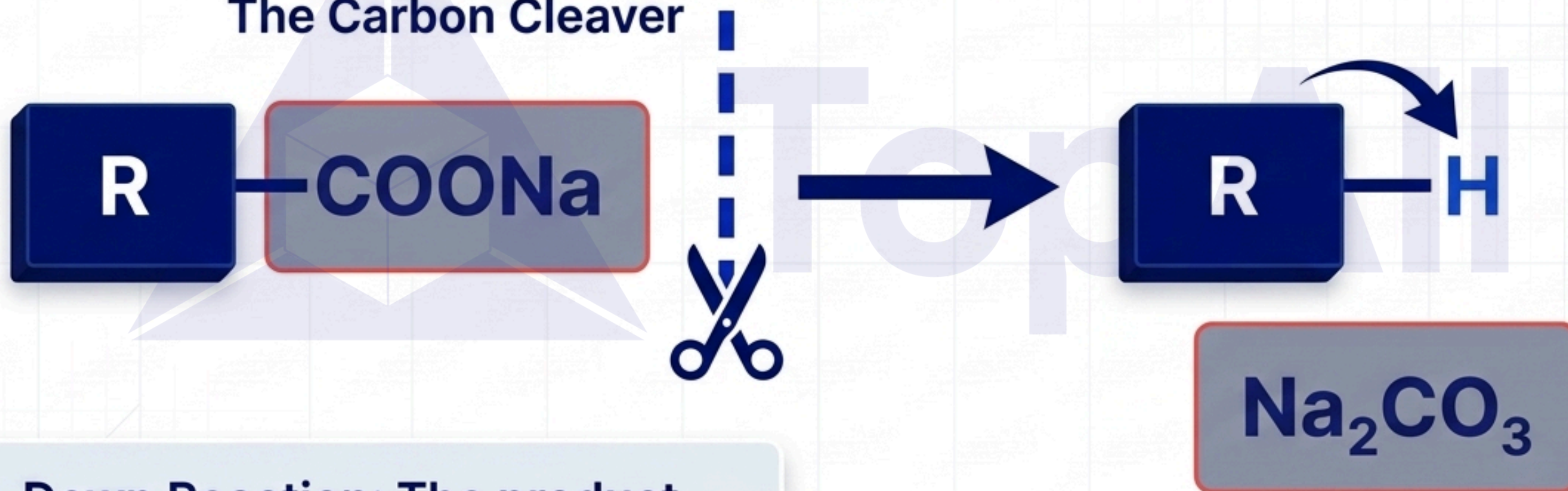
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Route 3: Decarboxylation



The Carbon Cleaver

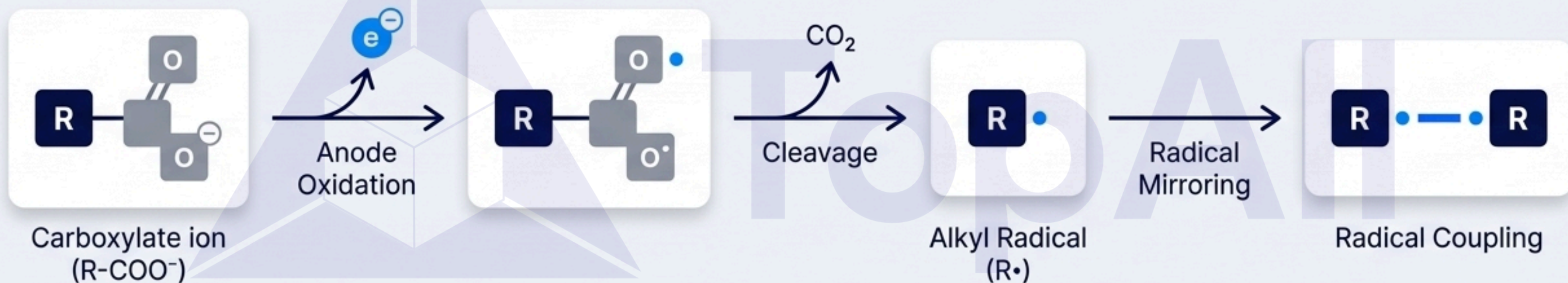


Step-Down Reaction: The product always has 1 carbon less than the parent carboxylic acid salt.

Carbon Chain Math: $N \rightarrow N-1$

Route 4: Kolbe Electrolysis

Creates strictly even-numbered symmetrical alkanes.



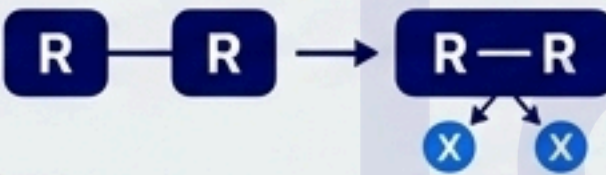
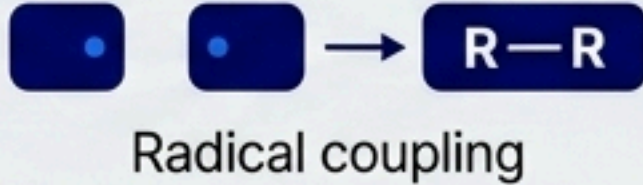
⚠ JEE TRAP

Methane (CH_4) cannot be prepared by Kolbe coupling. Because two radicals must combine ($R\cdot + R\cdot$), the minimum possible product is Ethane (C_2H_6).

Key Takeaway

Carbon Chain Math: $N \rightarrow 2N$

How to Choose the Right Synthesis Route

Reaction Route	Visual Hint	Carbon-Count Clue (Math)
Hydrogenation		Same C count ($N \rightarrow N$)
Wurtz Reaction		Carbon chains couple ($N \rightarrow 2N$)
Decarboxylation		-1 Carbon (Step-down) ($N \rightarrow N-1$)
Kolbe Electrolysis		Radical coupling (Strictly even) ($N \rightarrow 2N$)

Carbon-counting is the fastest way to eliminate wrong options in JEE multiple-choice conversion chains.



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