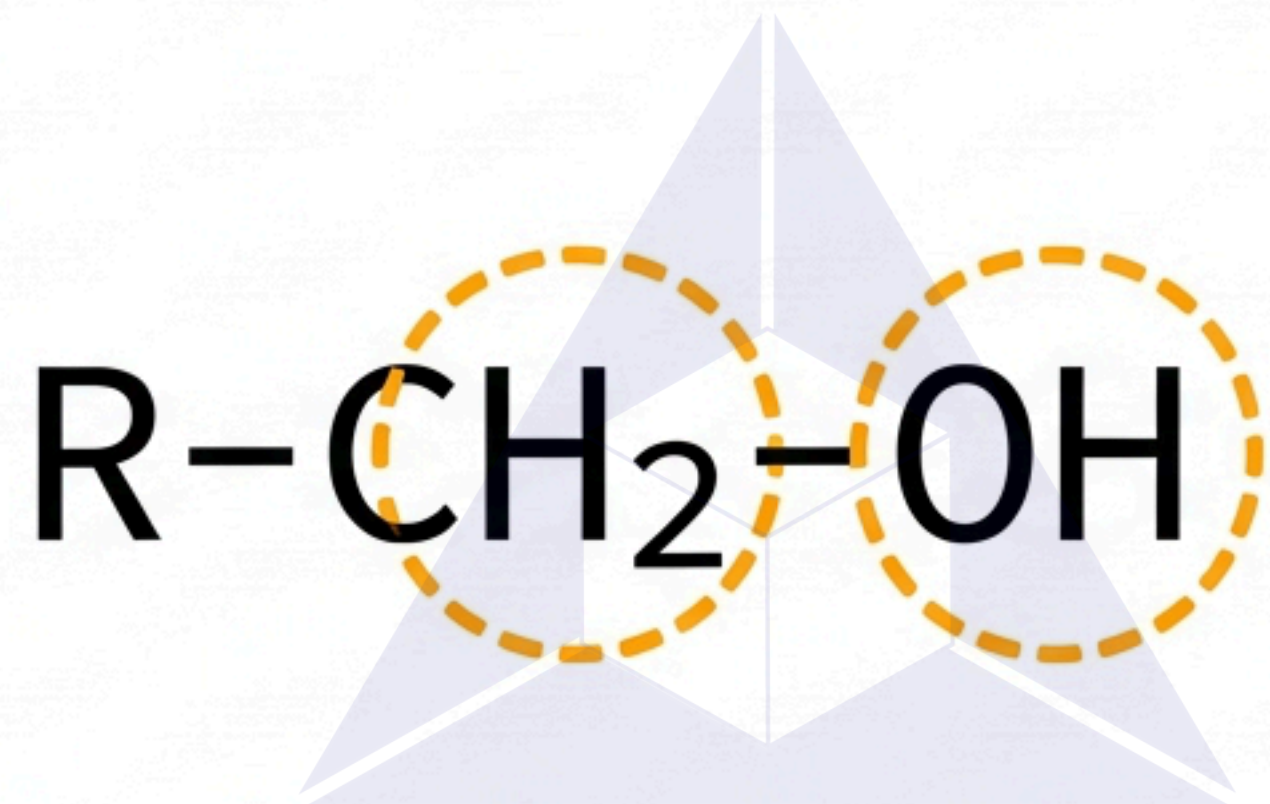


Alcohols to Carbonyl Compounds

The Reaction Blueprint: Oxidation Pathways and Mechanisms

A complete structural guide to reagents, substrates, and chemical logic.

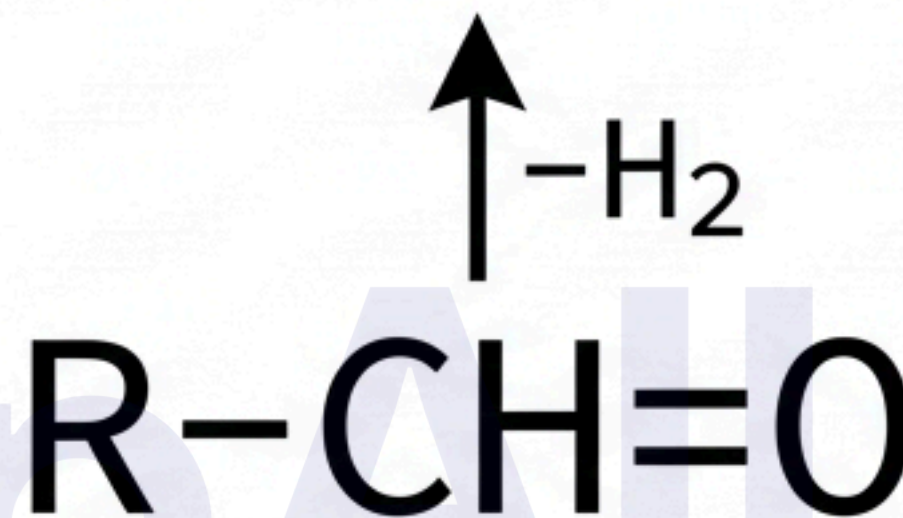
The Target Bonds



Oxidation requires the cleavage of two specific bonds.



Dehydrogenation



Oxidation = Loss of Dihydrogen

The cleavage of these bonds forms a carbonyl group. This fundamental mechanism governs all primary and secondary alcohol oxidations.

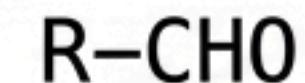
1° Alcohol



Contains two alpha-hydrogens.

CrO_3 (anhydrous)
or PCC

Aldehyde



High Yield

Pyridinium chlorochromate (PCC) is the preferred, highly efficient reagent to stop oxidation at the aldehyde stage.

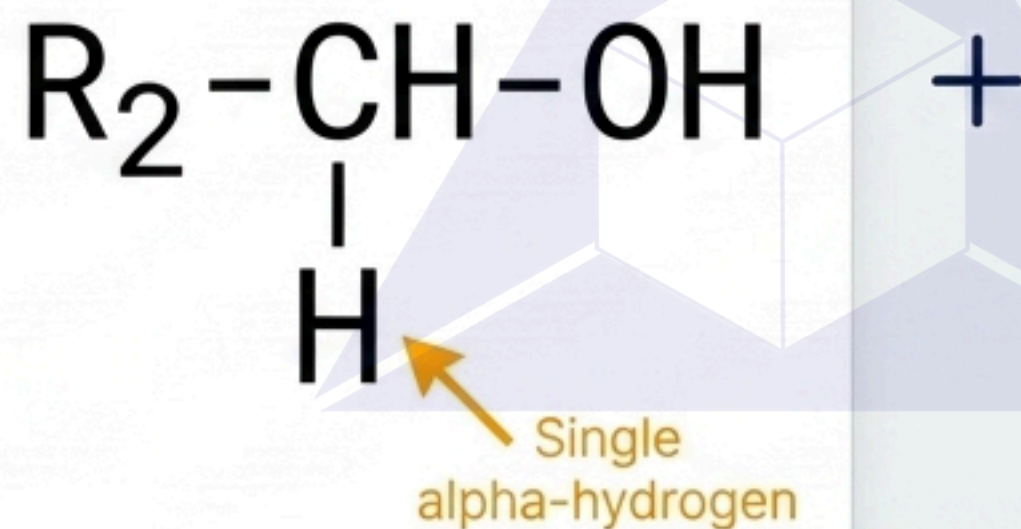
Acidified KMnO_4

Carboxylic Acid



Strong oxidizing agents bypass the aldehyde phase completely, fully oxidizing the substrate into a carboxylic acid.

2° Alcohol



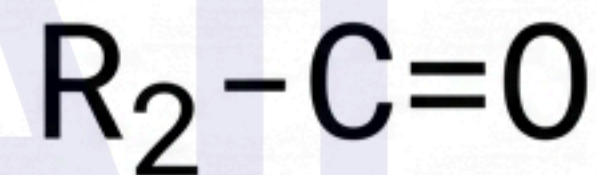
Chromic Anhydride



Standard Oxidant



Ketone



Oxidation halts naturally at the ketone. There are no remaining alpha-hydrogens to allow further oxidation to a carboxylic acid under normal conditions.



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

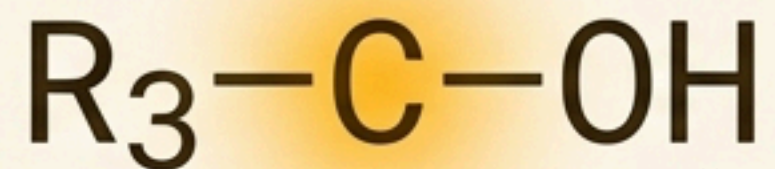


At prep.topall.app

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





Zero Alpha-Hydrogens

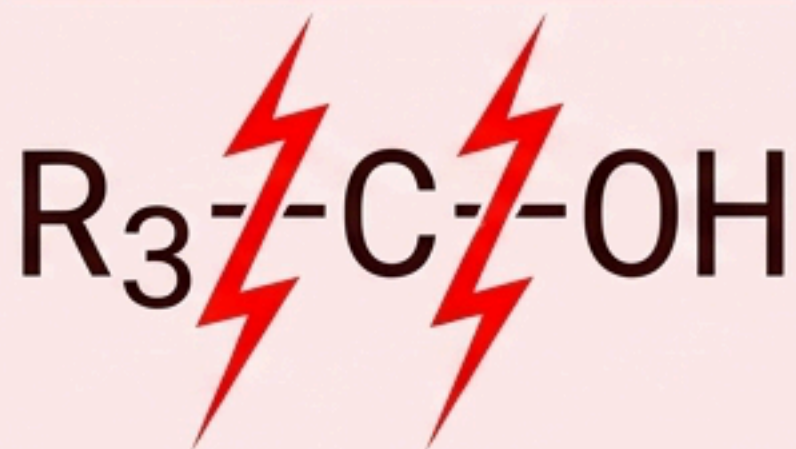
Without a C-H bond to cleave, the standard **dehydrogenation mechanism cannot occur**.

Result: Tertiary alcohols do not undergo standard oxidation.

Forced Oxidation Pathway

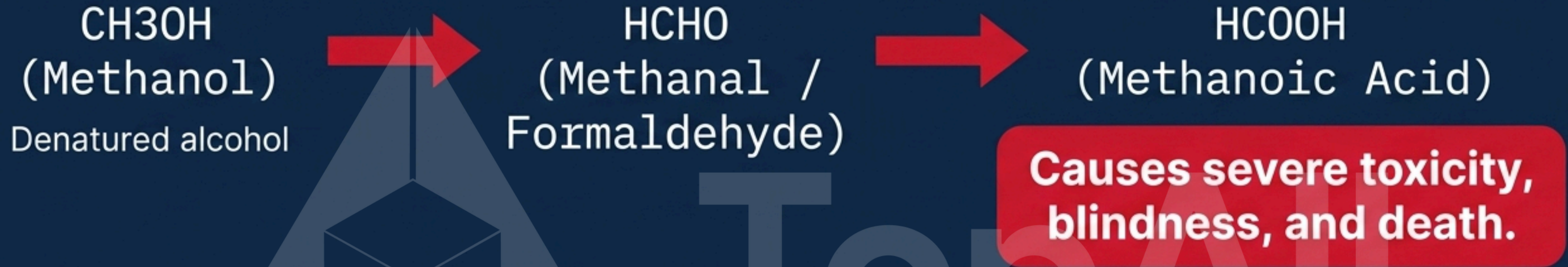
Strong Oxidant (KMnO_4) + Elevated Temperature

Destructive Cleavage



Mixture of smaller Carboxylic Acids.

Biological Oxidation: The Methanol Threat



The Antidote Mechanism

Treated via intravenous infusion of diluted ethanol. Ethanol swamps the oxidizing enzyme, occupying it long enough to allow the kidneys to excrete the unoxidized methanol safely.

The Catalyst Exception: Heated Copper (Cu at 573 K)



Master Oxidation Matrix

Substrate	Mild Oxidant (PCC / CrO_3)	Strong Oxidant ($\text{KMnO}_4 + \text{H}^+$)	Catalytic Heat (Cu at 573 K)
1° Alcohol	Aldehyde	Carboxylic Acid	Aldehyde
2° Alcohol	Ketone	Ketone	Ketone
3° Alcohol	No Reaction	Destructive Cleavage (smaller acids)	Alkene (Dehydration)



You've Learned the Theory.

Now Let's Test It.

Reading notes gets you knowledge.

Practicing MCQs gets you marks.

That's exactly what TopAll Pro is built for.

Try TopAll Pro Now

What TopAll Pro Does Differently

-  **Stuck? Snap it. Solve it. — Doubts AI**
Photo → step-by-step solution in seconds, 24/7
-  **Your AI Coach finds your blind spots**
Concept-level weakness detection — not just chapter-level
-  **4.5 Lakh+ questions. Never run out.**
13× more content than any other prep app in India
-  **Build your own test in 60 seconds**
Pick a chapter, set difficulty — AI does the rest instantly.
-  **AI Recommendation that helps you improve**
AI Recommendation Analysis your Tests and tell you where you need to improve.



Practice the moment you finish studying
Jump in while the concept is still fresh in your head

4.5L+
MCQs

1.5L+
Students

AI Powered
In-Depth Analysis