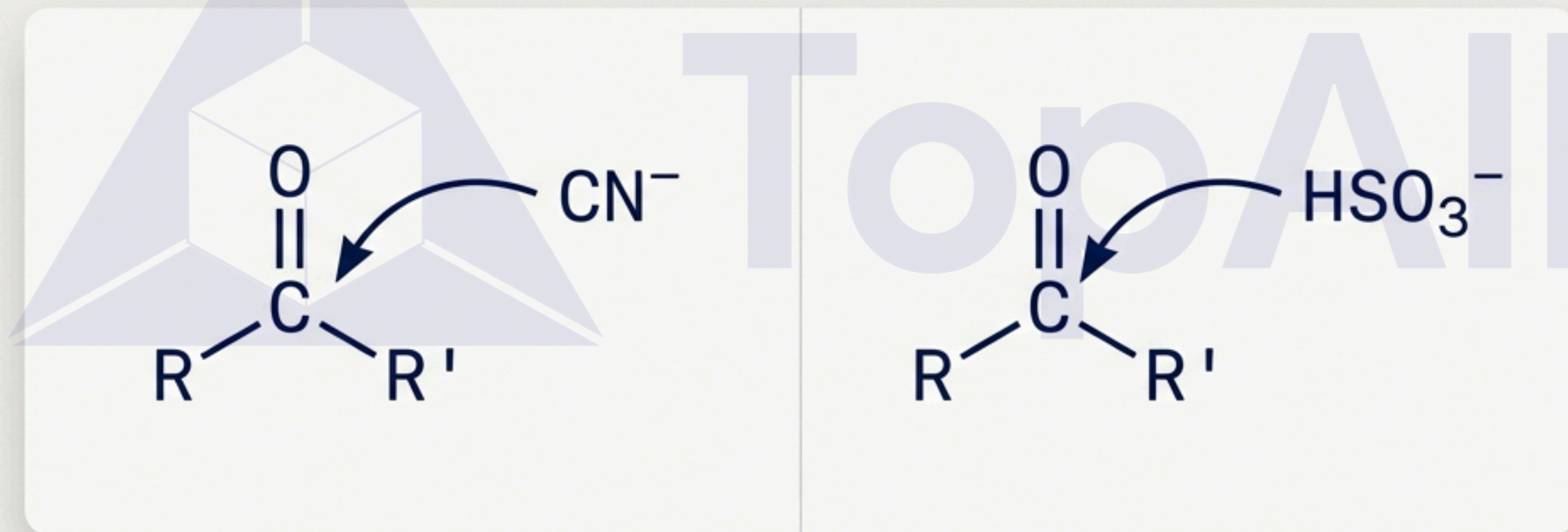


Addition of HCN and Sodium Hydrogensulphite

Mechanisms, catalysts, and synthetic lab utility for aldehydes and ketones.



[Cyanohydrin Synthesis]

[Base Catalysis]

[Aldehyde Purification]

Synthesizing Cyanohydrins



Aldehydes and ketones react with hydrogen cyanide (HCN) to undergo nucleophilic addition, yielding cyanohydrins.



Cyanohydrins are highly valuable synthetic intermediates, acting as vital stepping stones for further complex organic transformations.

Why is a Base Catalyst Required?



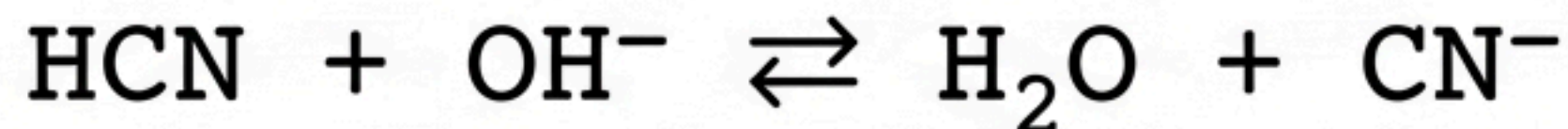
Pure HCN is too slow.

Pure hydrogen cyanide generates an insufficient concentration of the nucleophile, causing the reaction to occur at an impractically slow rate.



Base generates CN^- .

Adding a base catalyst extracts a proton from HCN, rapidly generating a high concentration of the reactive cyanide ion.



Key-Takeaway: The generated **Cyanide ion (CN^-)** is a strictly stronger nucleophile than neutral HCN, **readily and rapidly attacking the carbonyl carbon.**



**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

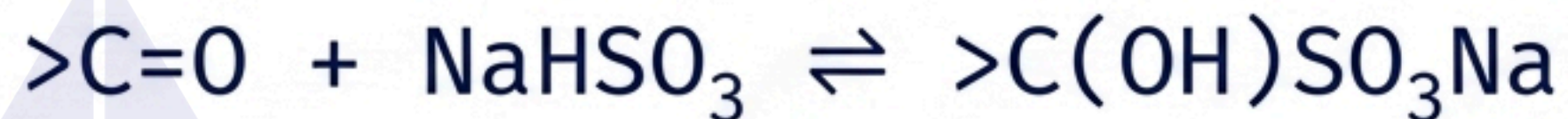
Key Highlights

- » 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



REACTION 02 • SODIUM HYDROGENSULPHITE

Formation of the Bisulphite Adduct



[Bisulphite addition compound]

Sodium hydrogensulphite adds across the carbon-oxygen double bond of aldehydes and ketones to form a distinct addition product.

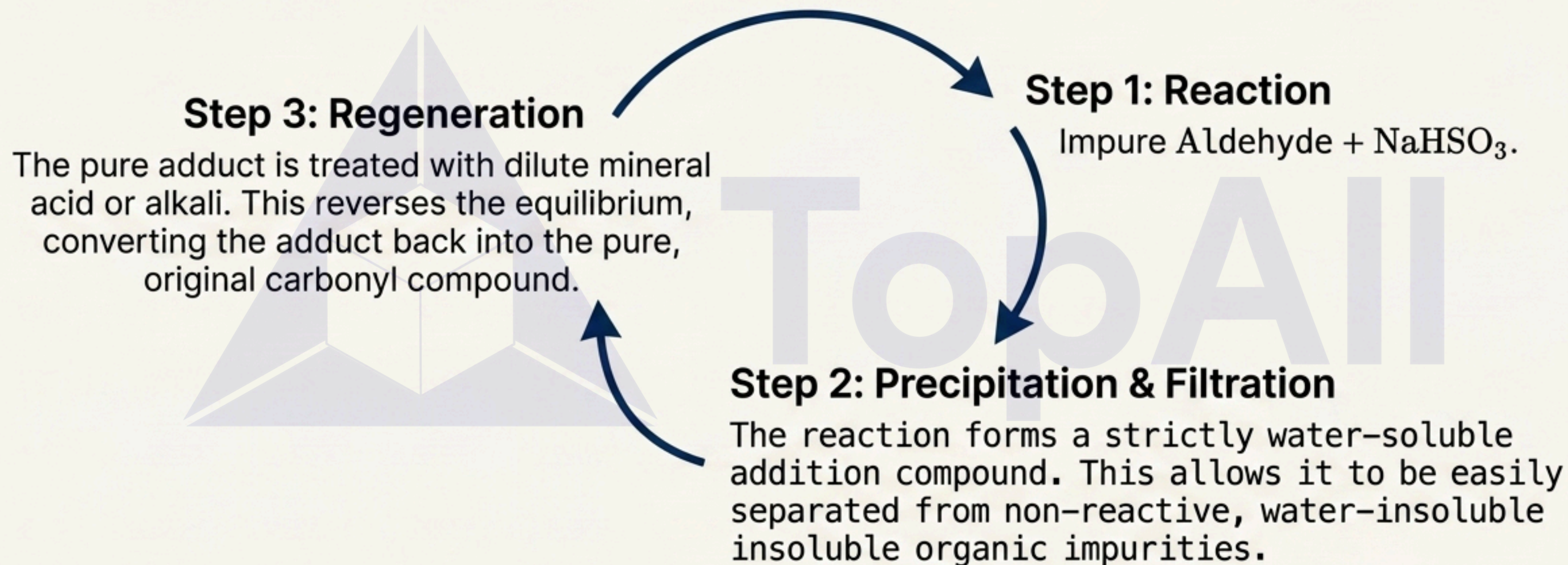
The Equilibrium Shift

Ketones: Equilibrium lies largely to the left due to bulky, sterically hindering alkyl groups.



Aldehydes: Favorable right-hand shift due to lower steric hindrance at the carbonyl carbon.

Separation and Purification



Because the reaction is highly reversible and the adduct is water-soluble, it serves as a perfect chemical 'filter' for extracting aldehydes from complex organic mixtures.

Comparing Nucleophilic Additions

Feature	HCN Addition	NaHSO ₃ Addition
Nucleophile	CN ⁻ (Requires Base)	HSO ₃ ⁻
Product Formed	Cyanohydrin	Bisulphite addition compound
Physical Property	Synthetic Intermediate	Water-soluble crystal
Primary Lab Utility	Stepping stone for further organic reactions	Separation and Purification of aldehydes

The Core Mechanism: Both reactions highlight the vulnerability of the planar, sp² hybridized carbonyl carbon to nucleophilic attack, ultimately shifting to electrically neutral sp³ tetrahedral intermediates.



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