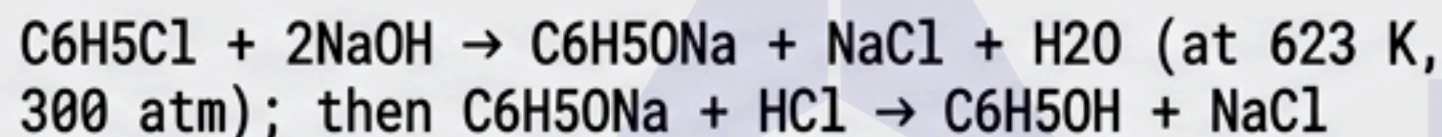


Preparation of Phenols

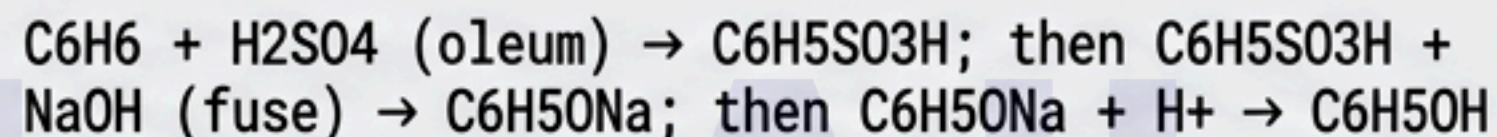
Mastering the four primary synthetic and industrial routes to phenol.

From Haloarenes (Dow Process)



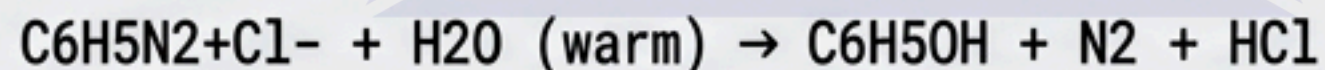
Extreme conditions required for nucleophilic substitution.

From Benzenesulphonic Acid



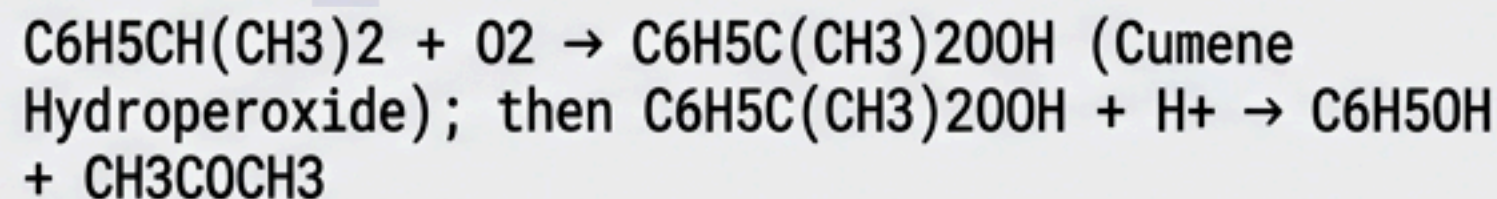
Historical method involving sulfonation and fusion.

From Diazonium Salts



Laboratory method for preparing pure phenol.

From Cumene (Industrial Method)



Most important commercial route; acetone is a valuable byproduct.

Key Vocabulary

Sensual story

diazonium salt

24px

cumene hydroperoxide

Four Pathways to Phenol

From Chlorobenzene

**Chlorobenzene + NaOH
(623K/320atm) → Sodium
Phenoxide → Phenol**

From Benzenesulphonic Acid

**Benzene + Oleum →
Benzenesulphonic Acid + molten
NaOH → Phenol**

From Diazonium Salts

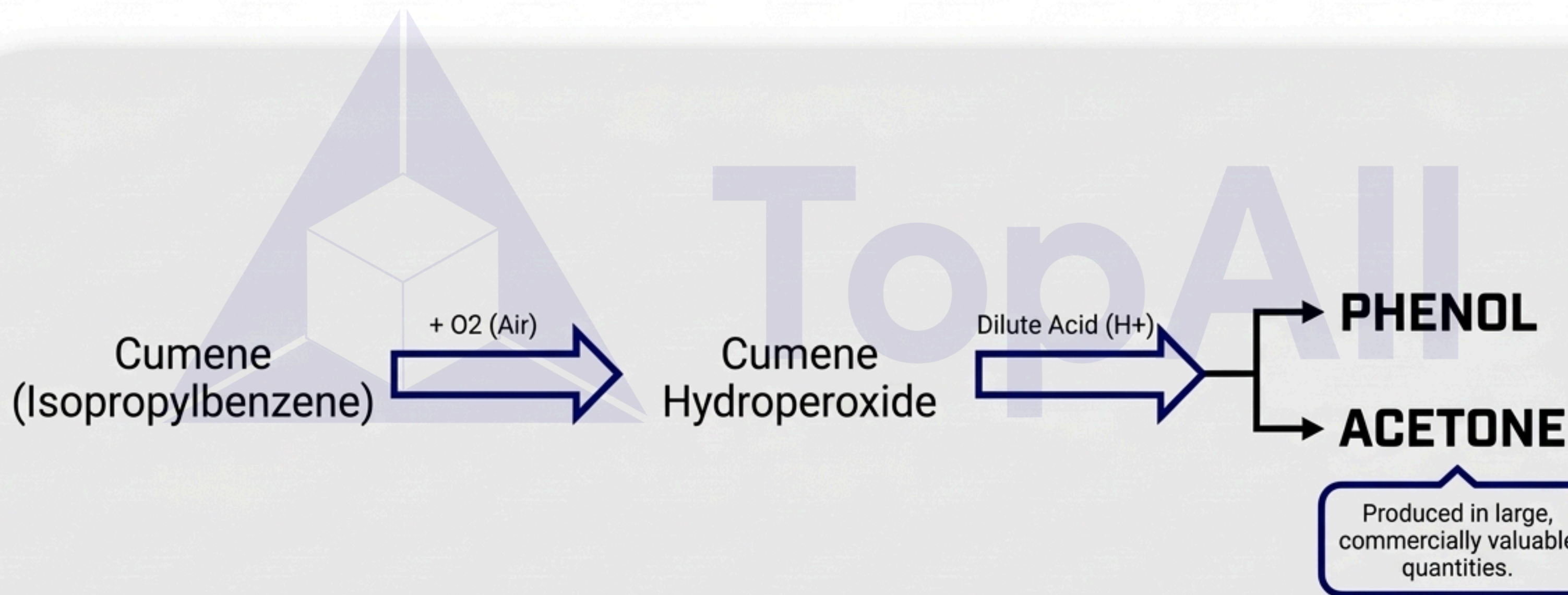
**Aniline + NaNO₂/HCl → Diazonium
Salt + warm H₂O → Phenol**

From Cumene (Industrial)

**Cumene + O₂ → Hydroperoxide +
H⁺ → Phenol + Acetone**

Industrial Spotlight: The Cumene Process

Most of the worldwide production of phenol relies on this highly efficient route.





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$$E=mc^2$$



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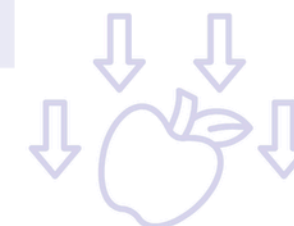
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Key Highlights

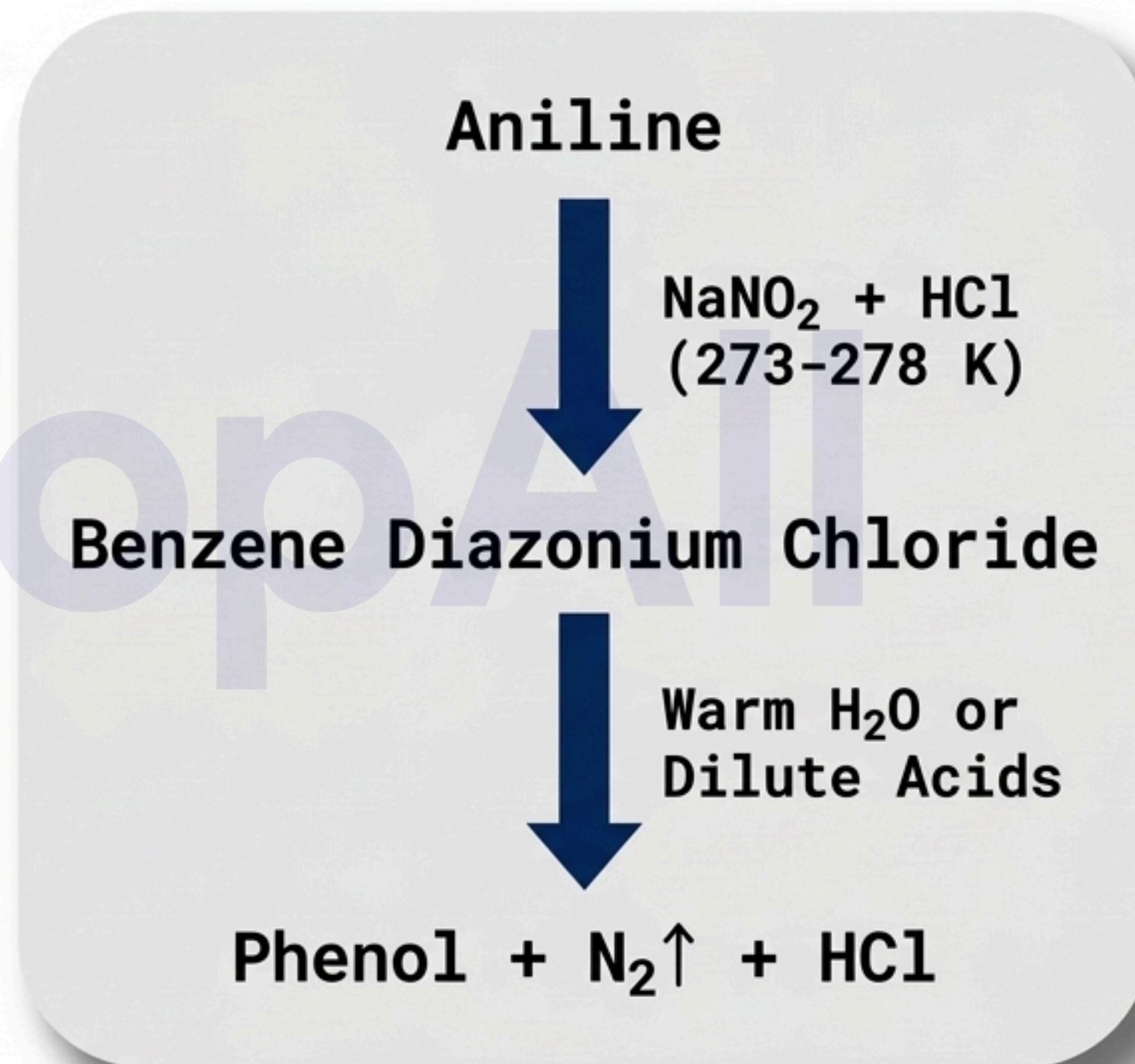
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The Lab Route: Diazonium Hydrolysis

A gentle laboratory method.

Primary aromatic amines are first converted to highly reactive diazonium salts at ice-cold temperatures (273–278 K), which are then easily hydrolyzed.



Exam Insight

Watch for this: The Hidden Byproduct

When examiners ask about the main industrial route (the Cumene Process), they frequently test your knowledge of the byproduct. Because it is commercially valuable, Acetone is just as important an answer as Phenol. Don't forget to account for it in reaction yield questions!



During the commercial manufacture of phenol from cumene, which commercially important byproduct is obtained?

A) Ethanol

B) Acetone

Correct! Acetone is formed alongside phenol when cumene hydroperoxide is treated with dilute acid.

C) Benzoic acid

D) Chlorobenzene

Module Summary

- Four Synthetic Routes: Phenol can be efficiently prepared via chlorobenzene (haloarenes), benzenesulphonic acid, diazonium salts, and cumene.
- The Industrial Standard: The cumene process is the dominant worldwide method, uniquely yielding both phenol and commercially valuable acetone.



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