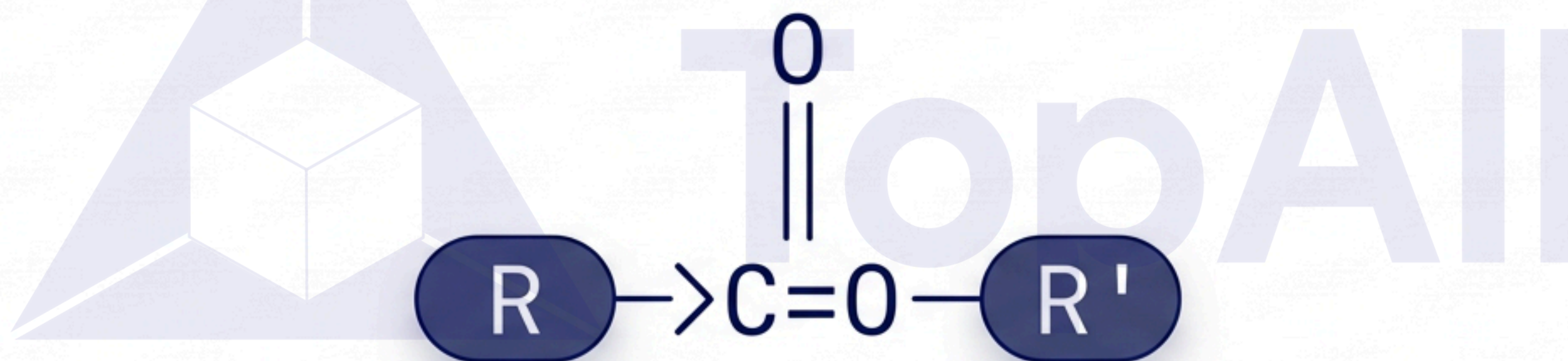


CBSE CLASS 12 CHEMISTRY • SECTION 8.2.3

Preparation of Ketones



Acyl Chlorides

Nitriles

Arenes

From Acyl Chlorides

Cadmium Catalyst

**Card 1: Reagent Preparation**

Cadmium chloride reacts with a Grignard reagent to produce the essential intermediate: dialkylcadmium.

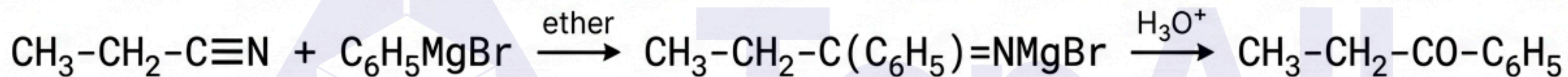
**Card 2: Ketone Formation**

Dialkylcadmium is treated with an acyl chloride (acid chloride) to selectively yield the final ketone.



Takeaway: This specific route avoids over-reaction. Dialkylcadmium (R_2Cd) selectively stops at the ketone stage without reacting further with the carbonyl group!

Nitriles + Grignard Reagent



Example: Propanenitrile to Propiophenone

Phase 1: Nucleophilic Attack (ether)

Grignard reagent attacks the electrophilic carbon in the nitrile group.

Phase 2: Imine Salt Intermediate

Forms a temporary $>\text{C}=\text{NMgBr}$ complex.

Phase 3: Acid Hydrolysis (H_3O^+)

The intermediate is rapidly hydrolyzed to cleave the nitrogen and form the $\text{C}=\text{O}$ double bond, yielding the ketone.



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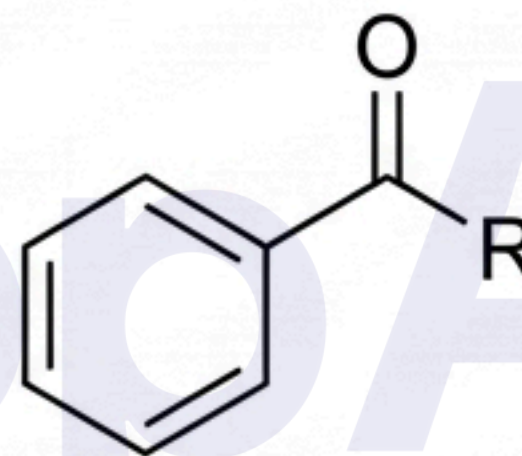
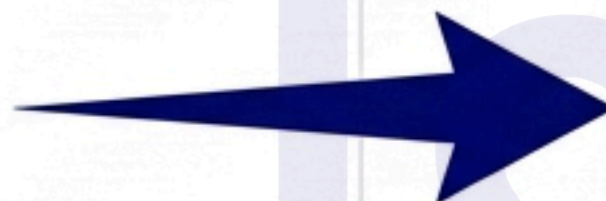


Synthesizing Aryl Ketones

The Raw Materials

Substrate: Benzene or a substituted benzene ring.

Acylating Agents: Requires either an Acid Chloride ($R\text{-COCl}$) OR an Acid Anhydride $((\text{RCO})_2\text{O})$.



The Target Products

This pathway is the premier method for creating aromatic ketones.

Examples: Acetophenone (Methyl phenyl ketone) or Benzophenone (Diphenyl ketone).

Key Takeaway: Aromatic rings are remarkably stable. They need a powerful electrophilic push to accept a carbonyl group. This requires a specific catalytic engine (detailed next).

Friedel-Crafts Acylation



The Catalyst

Anhydrous Aluminium Chloride (AlCl_3)

Acts as a powerful Lewis Acid.

It abstracts the halogen from the acyl chloride to generate a highly reactive acylium ion electrophile ($\text{R-C}^+=\text{O}$).

Reaction Type

Electrophilic Aromatic Substitution

The electrophile attacks the electron-rich pi-cloud of the benzene ring.

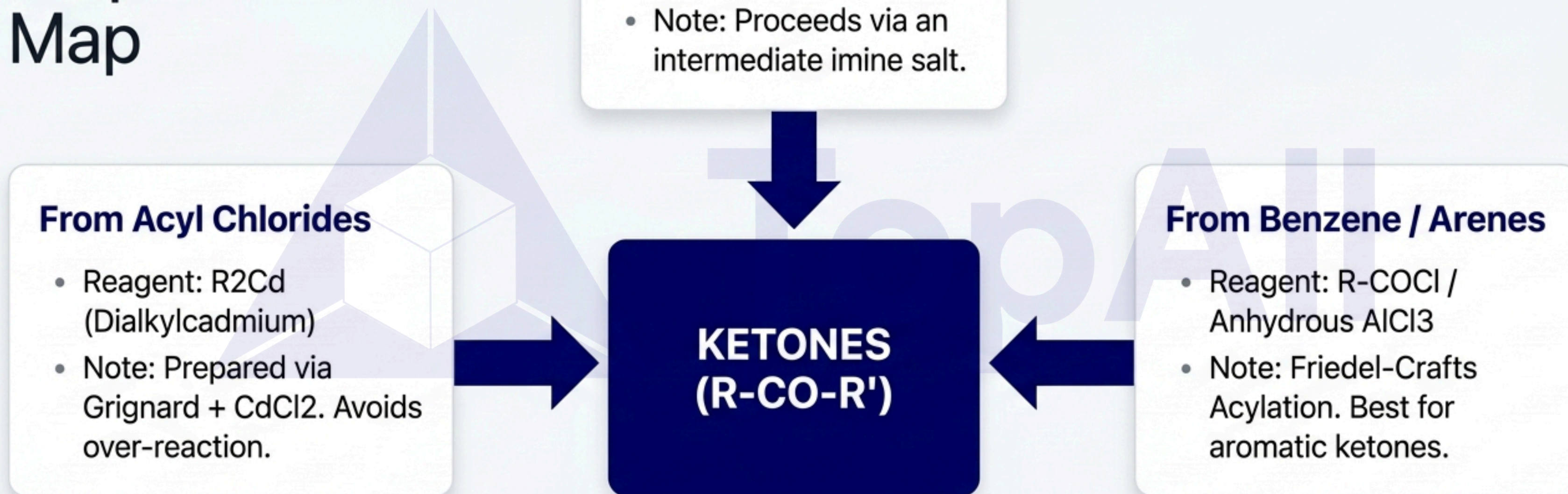
Condition Warning

Moisture is Fatal

Water destroys the Lewis acid catalyst.

Writing the keyword 'Anhydrous' is strictly mandatory.

Ketone Preparation Map



Exam-Smart Mastery: Master these 3 specific pathways to easily distinguish ketone synthesis from general aldehyde preparations!



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