



Haloarenes: Deactivating but Ortho-Para Directing

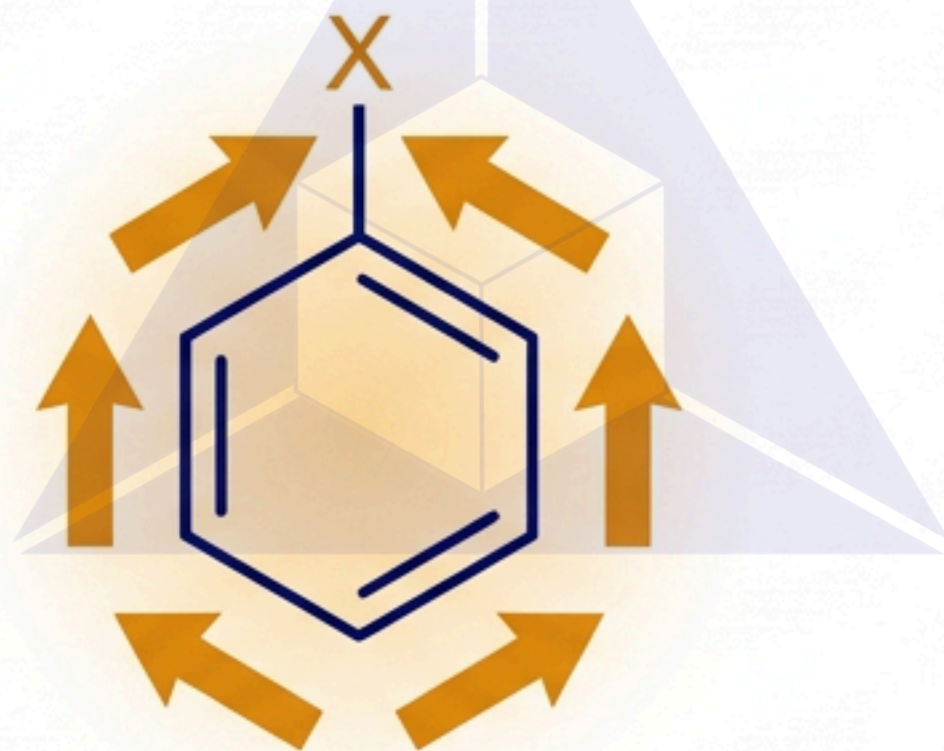
Decoding the mechanisms of Electrophilic Substitution.

The Dual Nature of Halogen Substituents



Unlike most substituents, halogens present a contradiction in electrophilic aromatic substitution, acting simultaneously as a resistor and an amplifier.

The Drain



"Deactivating" — Reactivity speed is globally controlled by the Inductive Effect.

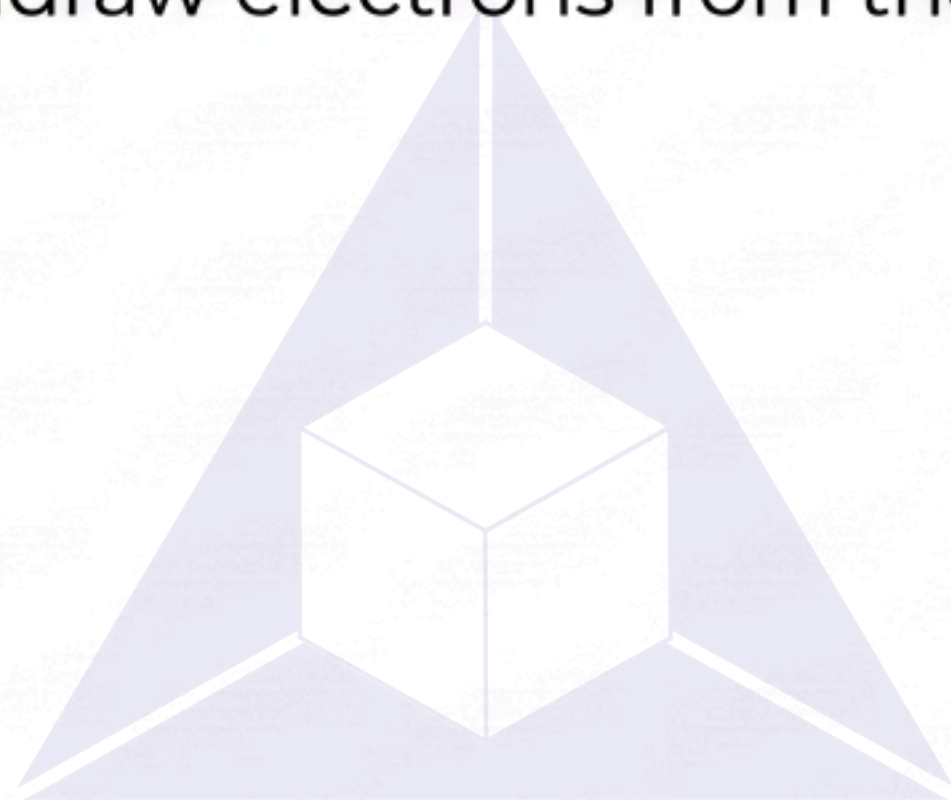
The Amplifier



"Ortho-Para Directing" — Attack orientation is locally controlled by the Resonance Effect.

Inductive (-I) Effect: Global Deactivation

Halogens (Cl, Br, I) are highly electronegative. Through the sigma (σ) bond, they withdraw electrons from the ring, destabilizing intermediate carbocations.



Electrophilic substitution occurs more slowly and requires harsher, more drastic conditions than in pure benzene.



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

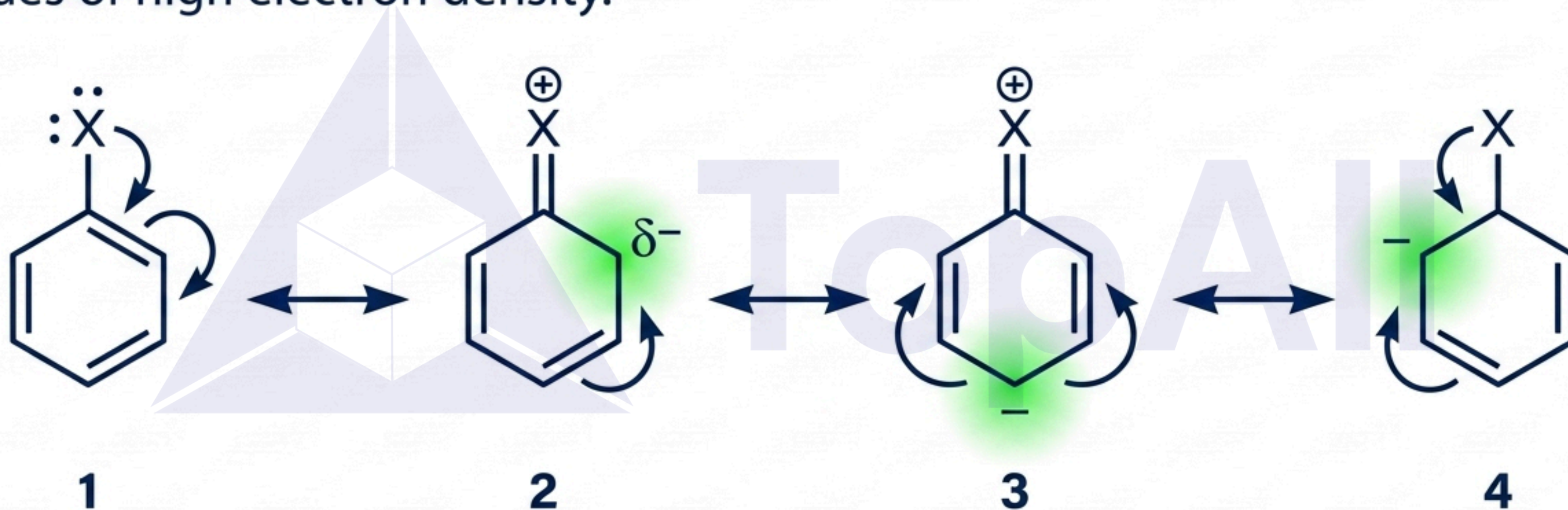
- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
- » Get Clear Explanations, Not Just Marks
- » Track Your Performance Smarter



Resonance (+R) Effect: The Directing Influence

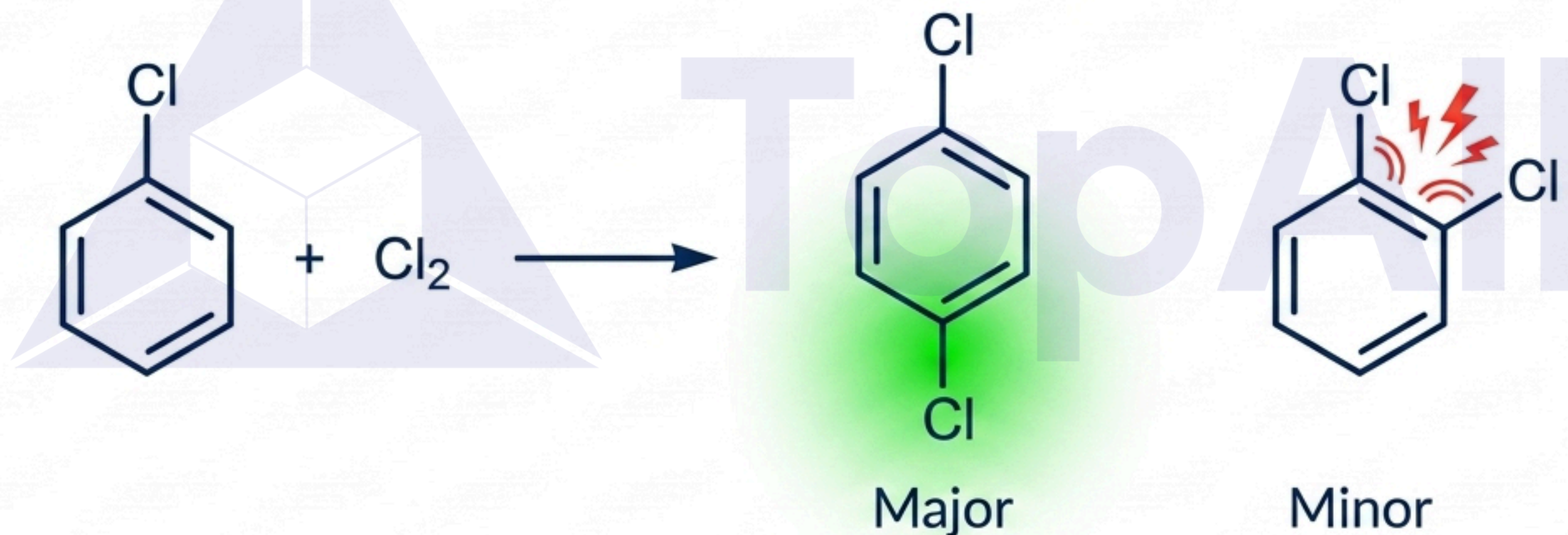


Halogen lone pairs conjugate with the ring's π -electrons, creating localized nodes of high electron density.



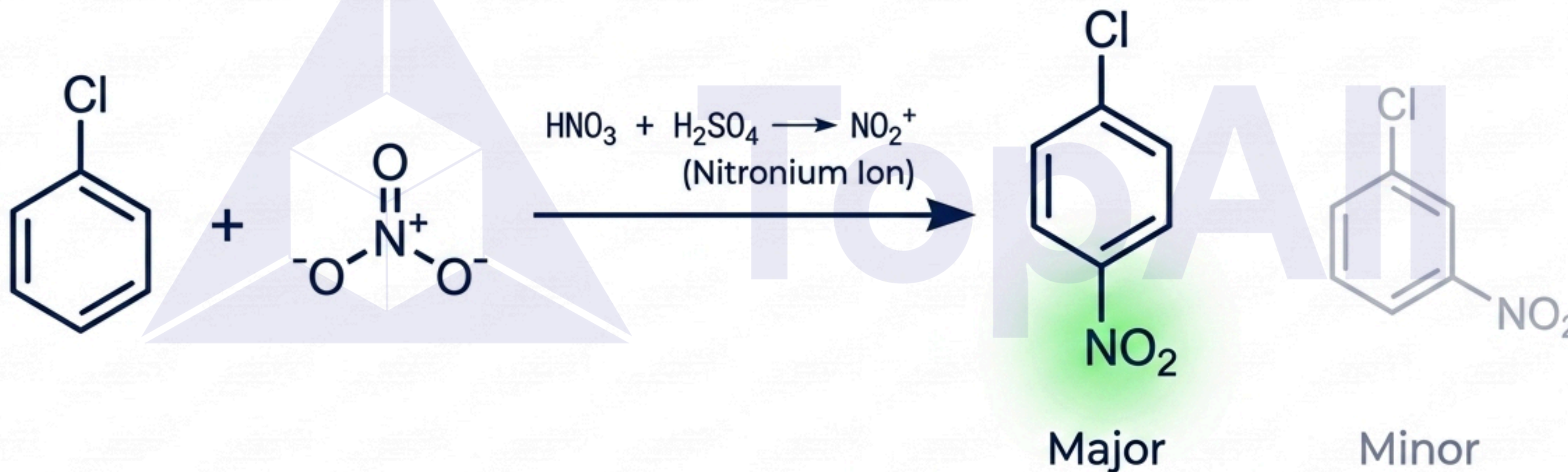
The resonance effect opposes the inductive effect specifically at the ortho and **para** positions, making them the primary targets for incoming electrophiles.

Reaction: Halogenation



A Lewis acid catalyst (FeCl_3) is required to generate the Cl^+ electrophile. The Para isomer predominates due to spatial symmetry and lower steric hindrance.

Reaction: Nitration

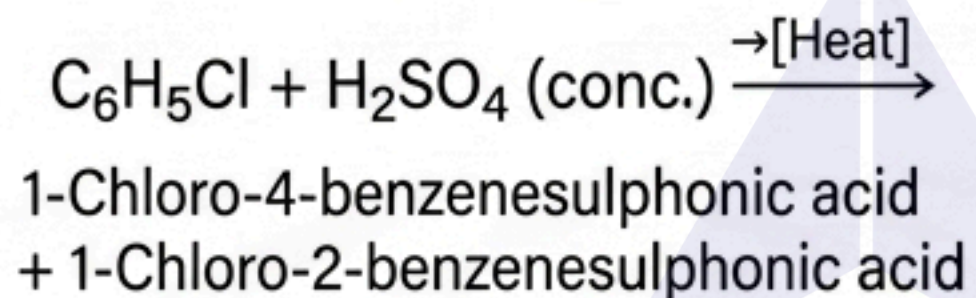


The “Nitrating Mixture” ($\text{HNO}_3 + \text{H}_2\text{SO}_4$) is necessary to generate the powerful **Nitronium ion** (NO_2^+) electrophile to attack the deactivated ring.

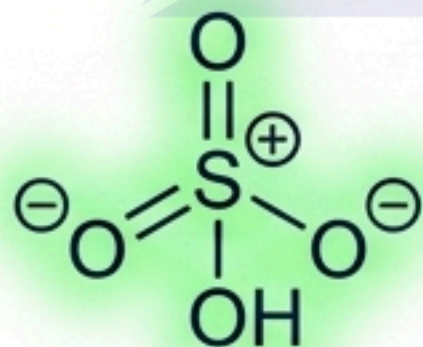
Sulphonation & Friedel-Crafts Reactions



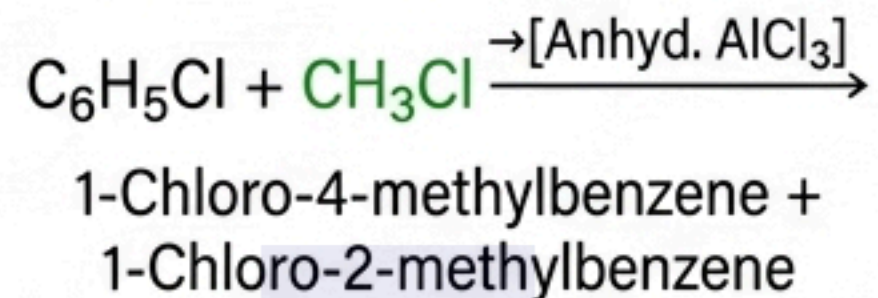
Sulphonation



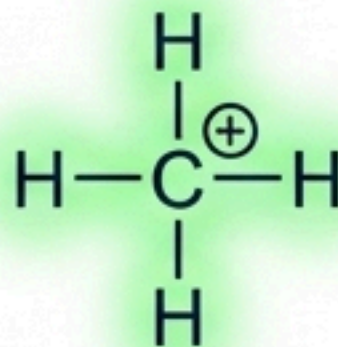
- Reagents: Conc. H_2SO_4 , Heat
- Electrophile: SO_3H^+
- Product: 4-Chlorobenzenesulphonic acid (Major)



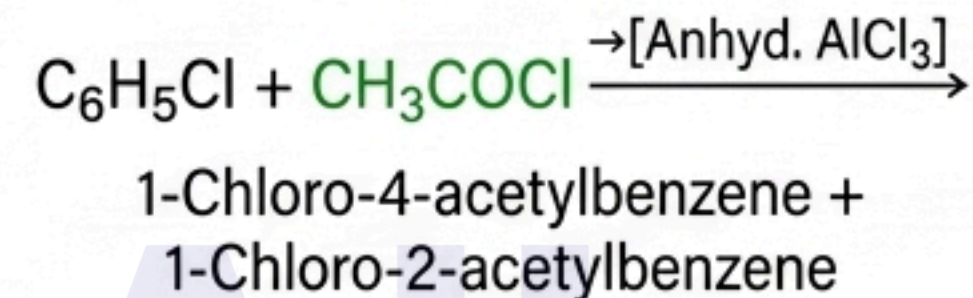
F.C. Alkylation



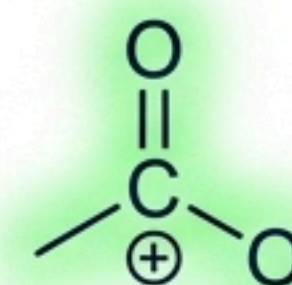
- Reagents: CH_3Cl , Anhyd. AlCl_3
- Electrophile: CH_3^+ (Methyl)



F.C. Acylation



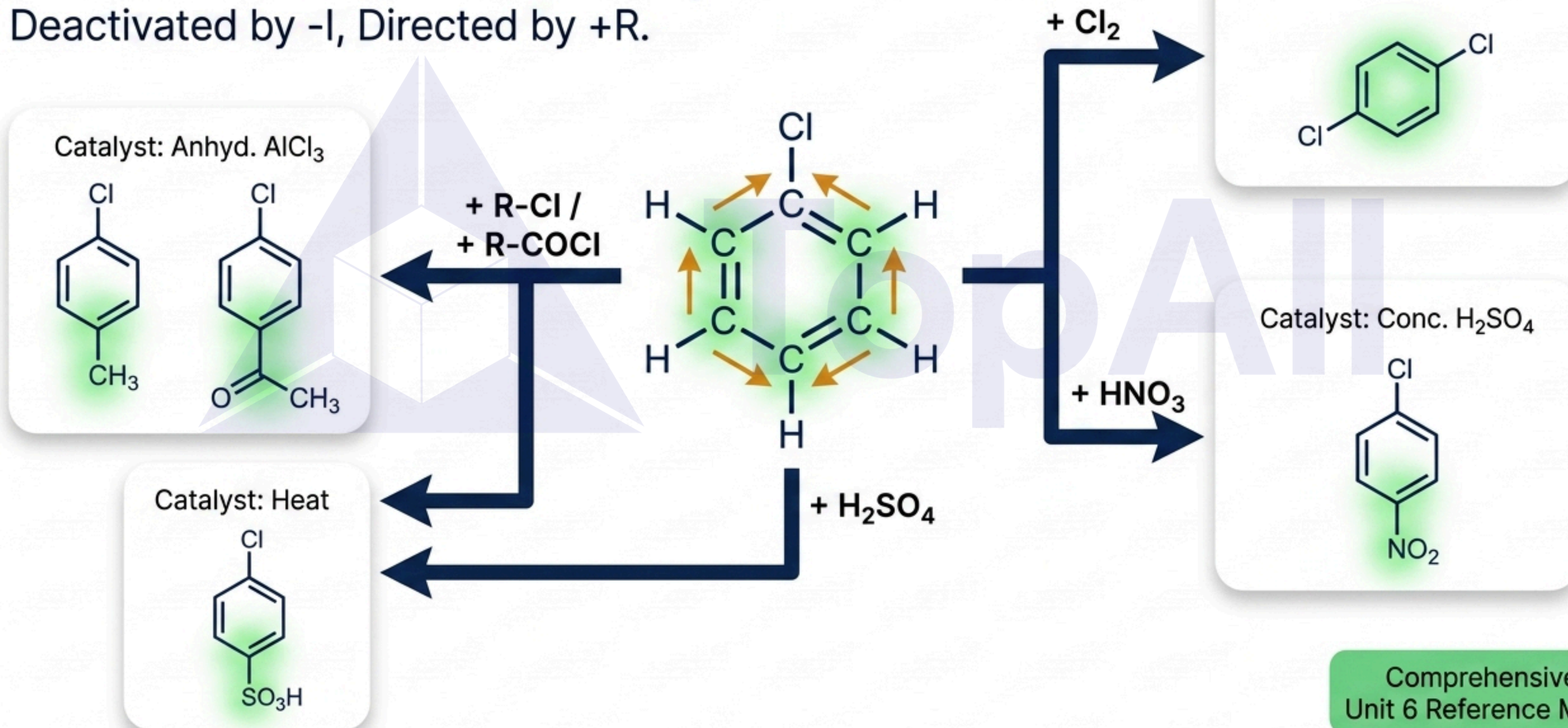
- Reagents: CH_3COCl , Anhyd. AlCl_3
- Electrophile: CH_3CO^+ (Acyl)



In all electrophilic substitutions, the para derivative is the major product.

Electrophilic Substitution Map

A unified view of haloarene reactivity:
Deactivated by -I, Directed by +R.





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