

UNIT 7 • ALCOHOLS, PHENOLS AND ETHERS

Kolbe's, Reimer-Tiemann, Zinc Dust & Oxidation of Phenols

High-yield chemical reactions, intermediates, and electrophilic aromatic substitutions.

Key Target Structures

Phenoxide Ion

[C6H5O^-]

Salicylaldehyde

[o-HOC6H4CHO]

Benzoquinone

[Conjugated Diketone]



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$$E=mc^2$$



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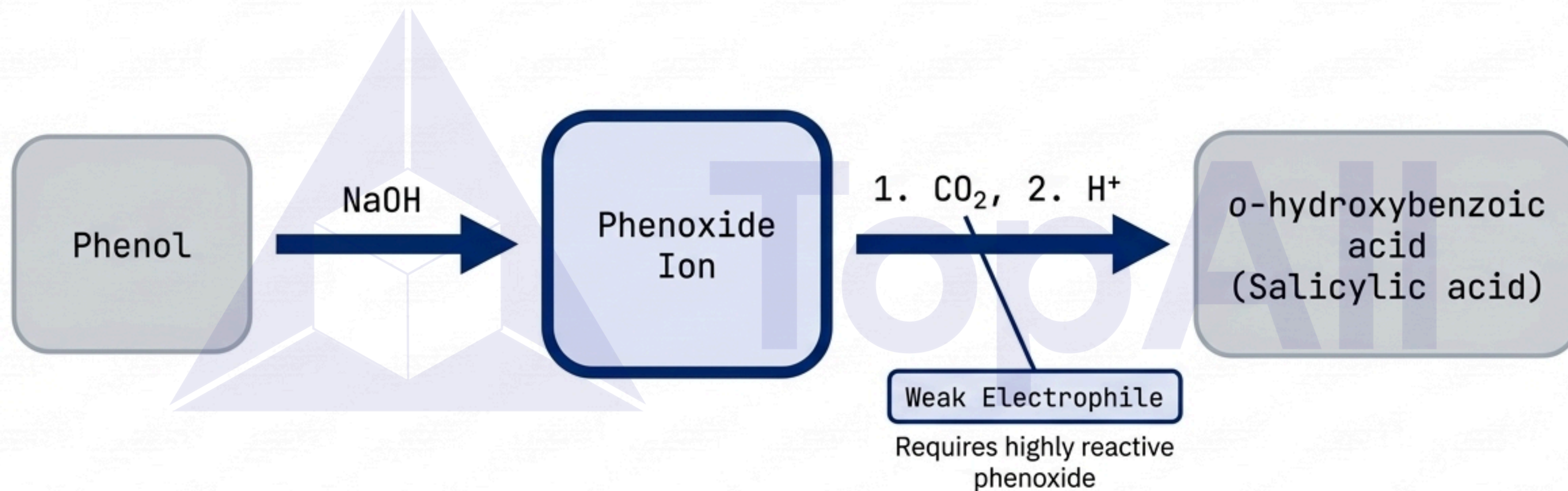
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Key Highlights

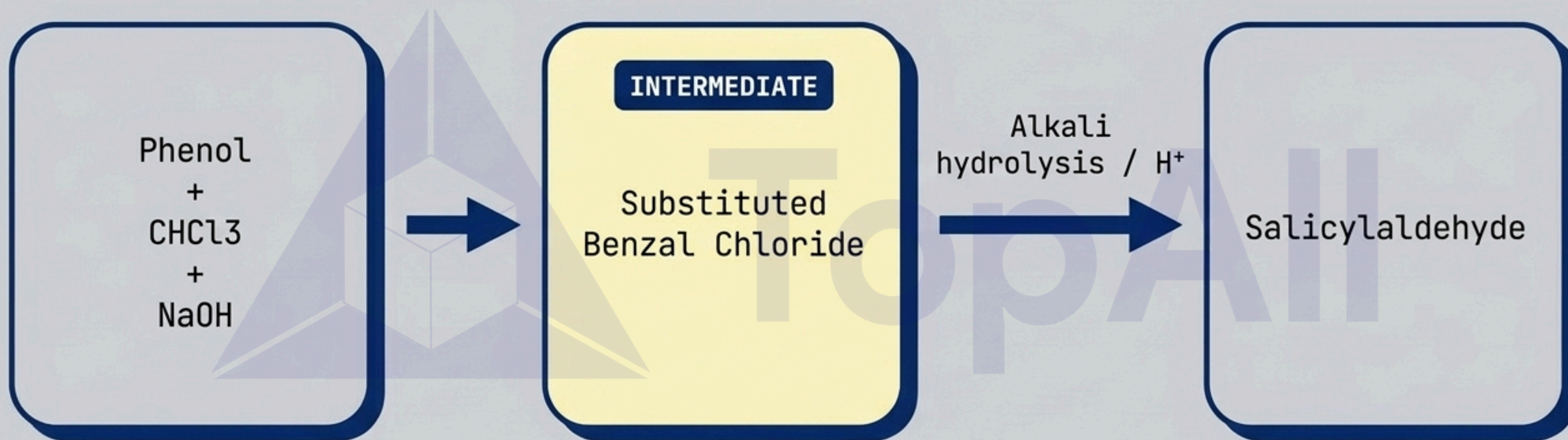
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Reaction Spotlight: Kolbe's Reaction

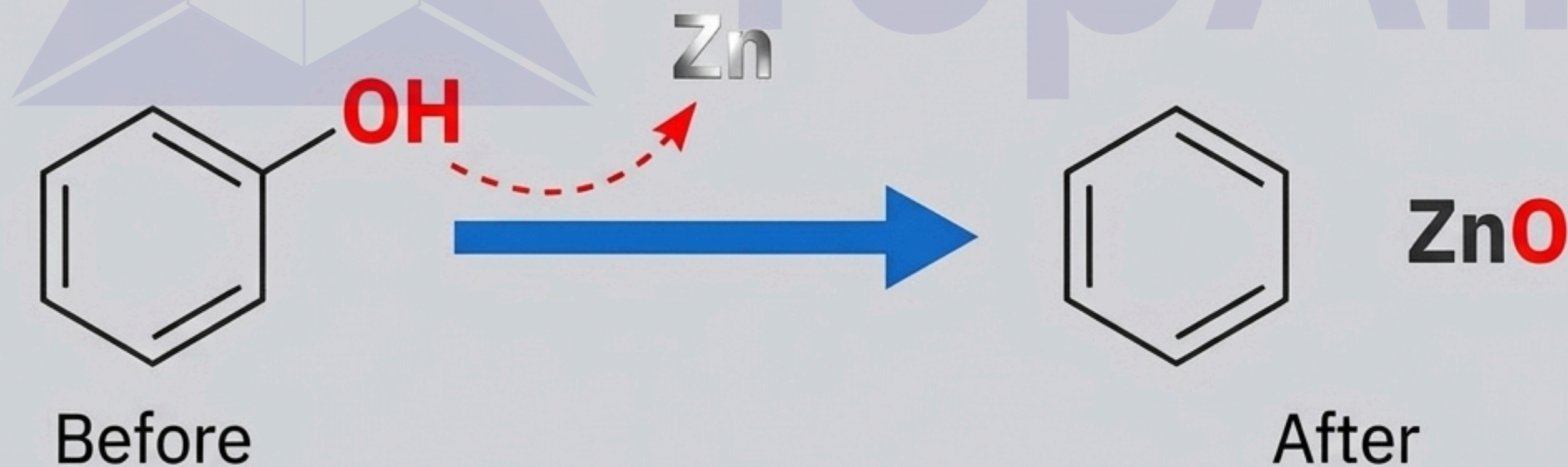
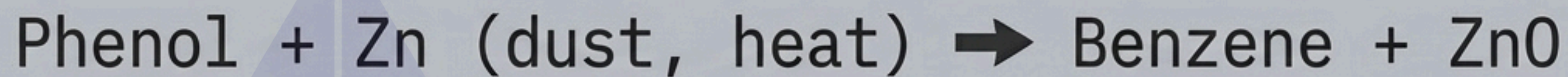


Reaction Spotlight: Reimer-Tiemann Reaction

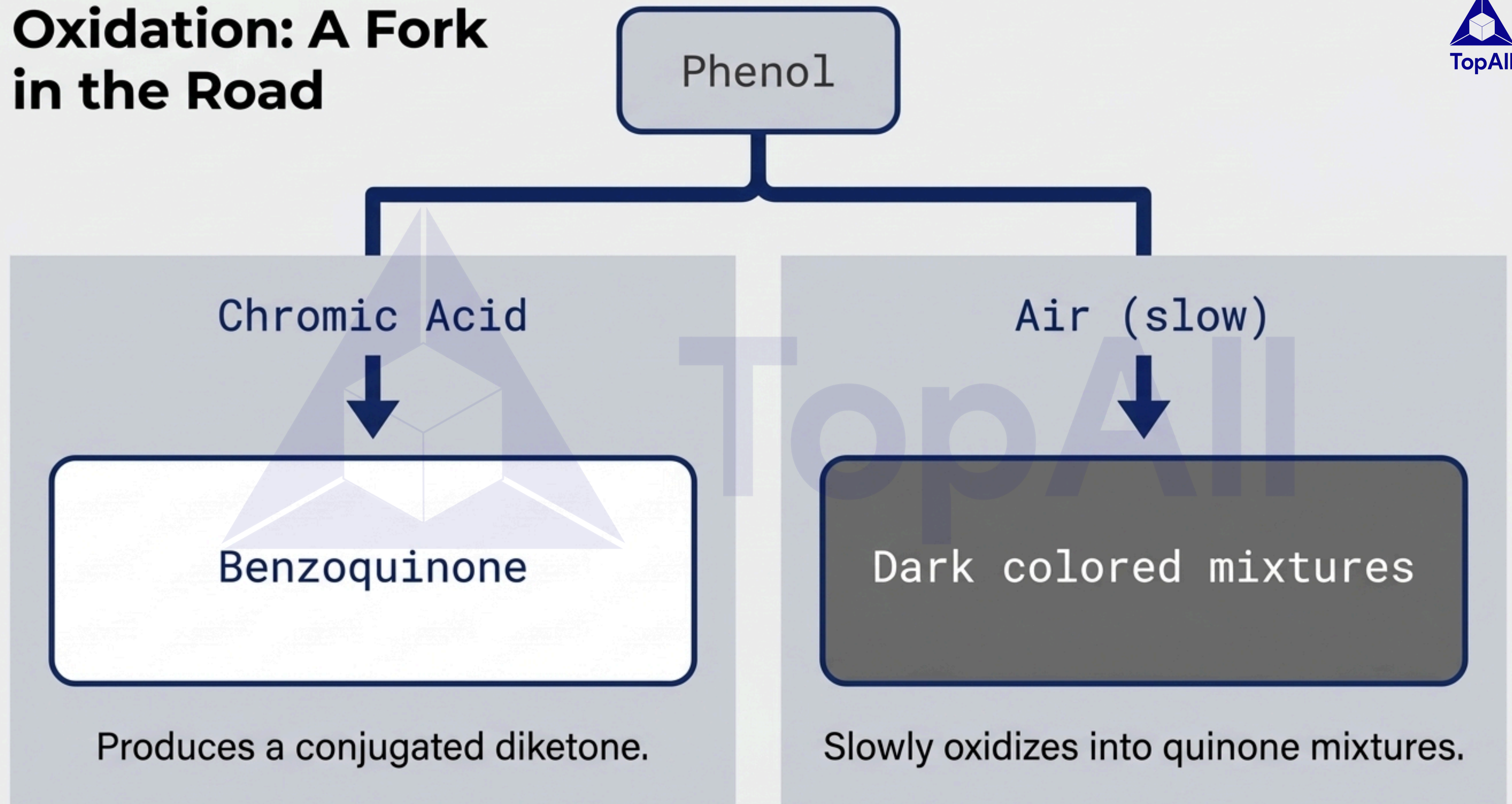


A $-\text{CHO}$ group is introduced at the ortho position of the benzene ring.

Structural Alteration: Zinc Dust



Oxidation: A Fork in the Road



Watch for this: The Weak Electrophile Trap

Phenol + CO ₂	 [NO REACTION]
Phenoxide ⁻ + CO ₂	 [REACTION PROCEEDS]

Kolbe's reaction works with CO₂ specifically because the phenoxide ion is more reactive toward electrophilic substitution than phenol itself. It is reactive enough to attack even a weak electrophile like CO₂.

Consolidation

- **Synthesis Pathways:** Kolbe's creates salicylic acid (via phenoxide), and Reimer-Tiemann creates salicylaldehyde (via a benzal chloride intermediate).
- **Structural Breakdown:** Zinc dust completely strips the oxygen to yield benzene, while chromic acid oxidation disrupts aromaticity to form **benzoquinone**.



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