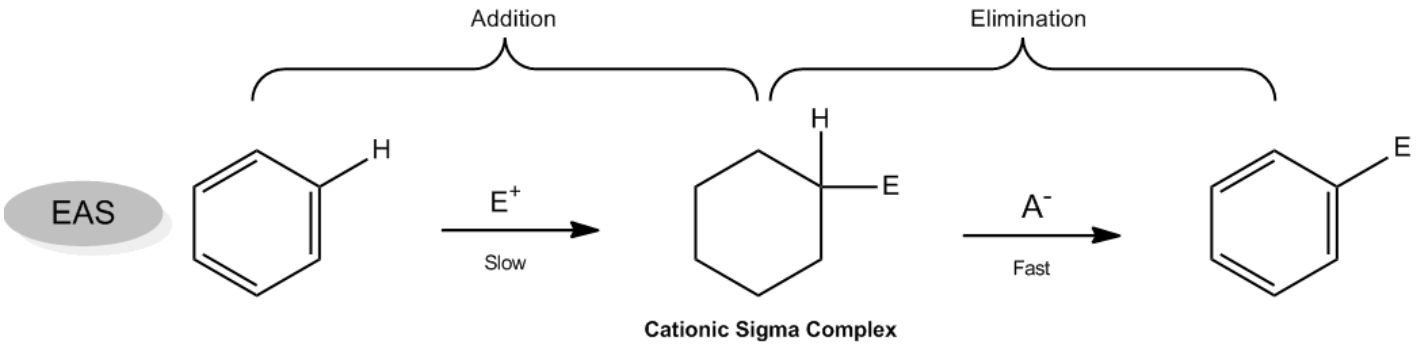
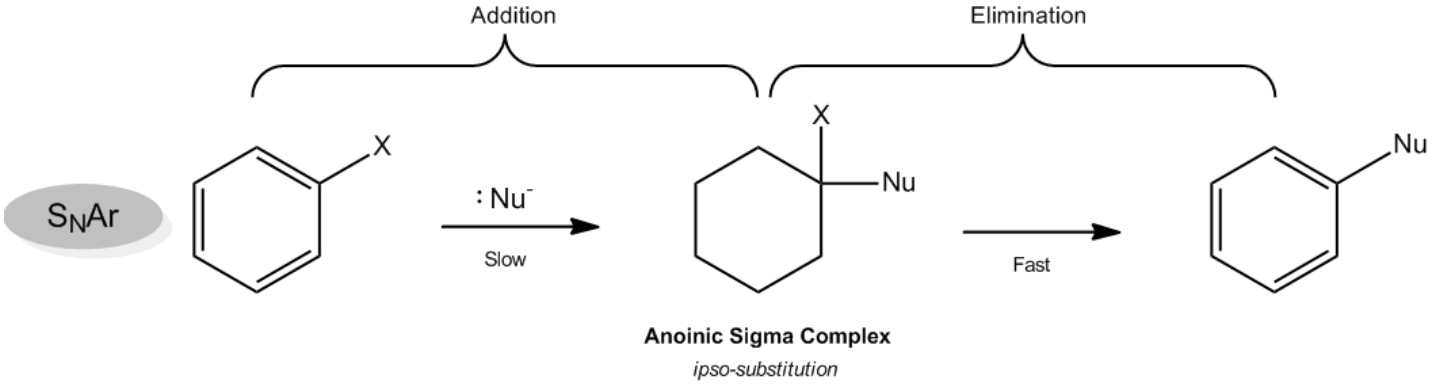
CONCEPT: S_NAr ADDITION-ELIMINATION MECHANISM

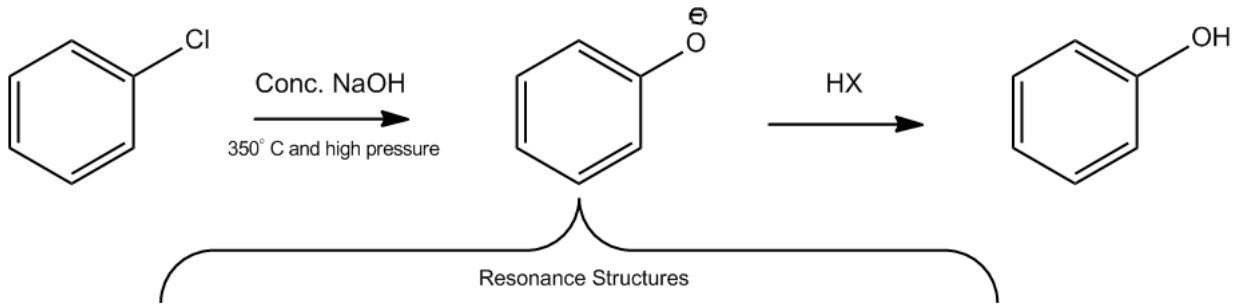
Unlike EAS, where addition is initiated by the presence of a strong electrophile, addition-elimination can also be initiated by a *strong nucleophile* in the presence of a *good aryl leaving group*.

- Reaction has similarities to S_N2 but it is not _____
- Known as *Addition-Elimination Nucleophilic Aromatic Substitution*, ***S_NAr*** or ***ipso-substitution.***





An early method of preparing phenol called the ***Dow Process*** used chlorobenzene, NaOH and high heat to force S_NAr.



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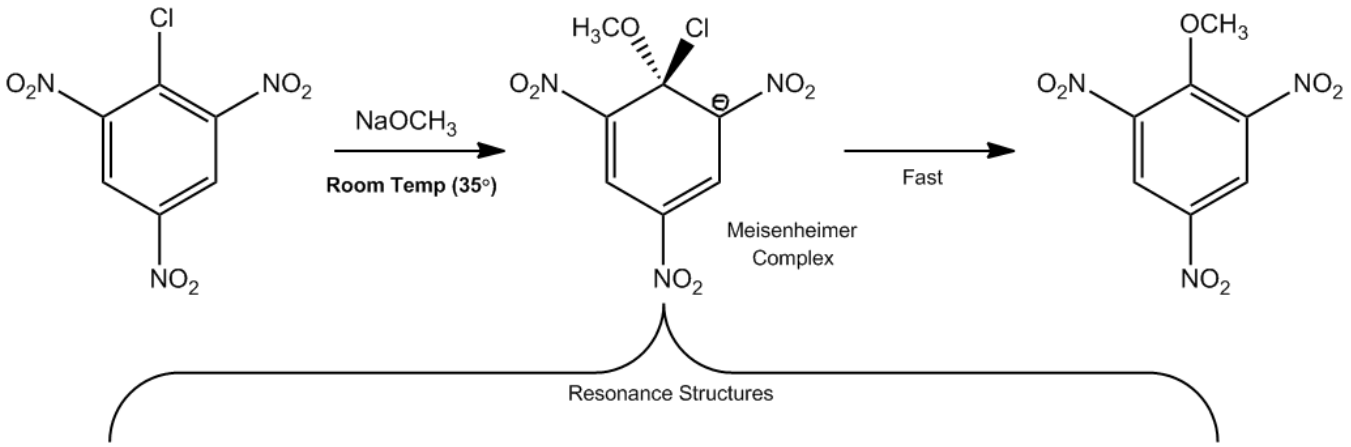
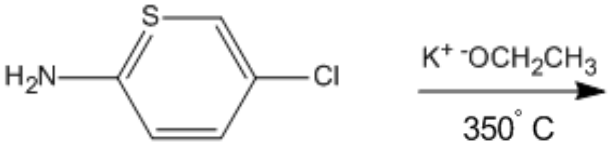
CONCEPT: THE MEISENHEIMER COMPLEX

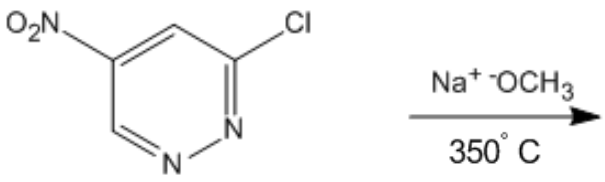
The ***Dow Process***, a typical S_NAr reaction, requires tons of heat and pressure to proceed forward.

- This is due to the instability of the anionic sigma-complex
- **W**ithdrawing groups or **H**eteroatoms to the **O**rtho or **P**ara positions (**WHOP**) stabilize the intermediate
  - □ A classical trinitrobenzene ***Meisenheimer Complex*** can proceed in *room temperature*

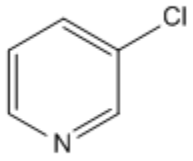


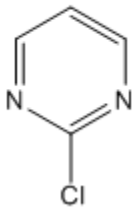
EXAMPLE: Use resonance structures to determine which of the following ipso-substitutions is more favored.

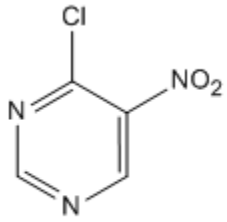


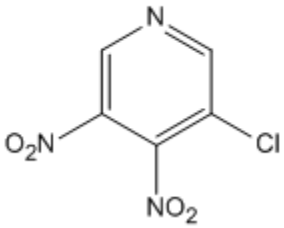


EXAMPLE: Which of the following compounds will most readily undergo nucleophilic aromatic substitution in the addition-elimination pathway?



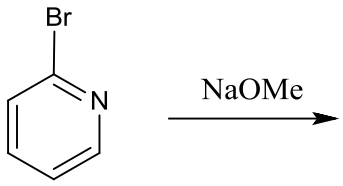




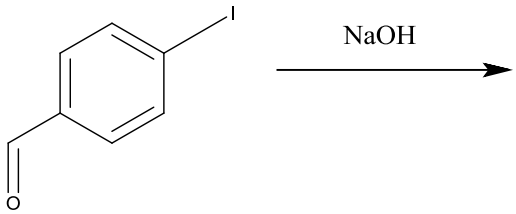


PRACTICE: Provide the structure and name of the intermediate formed from the reaction of 1-bromo-2,4,6-trinitrobenzene with one equivalent of sodium methoxide.

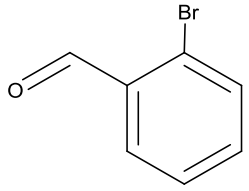
PRACTICE: Provide the major organic product for the following reaction.

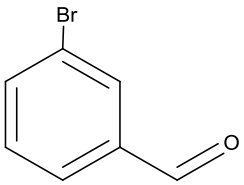


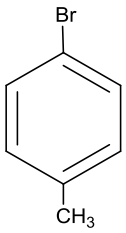
PRACTICE: Provide the major organic product for the following reaction.

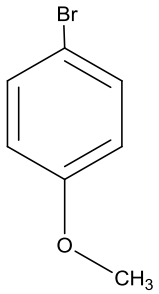


PRACTICE: Which of the following compounds is most likely to undergo nucleophilic aromatic substitution via the addition-elimination Pathway?









PRACTICE: Which of the following compounds is most likely to undergo nucleophilic aromatic substitution via the addition-elimination Pathway?