

## CHAPTER OVERVIEW

### 18: REACTIONS OF AROMATIC COMPOUNDS

#### LEARNING OBJECTIVES

After reading this chapter and completing ALL the exercises, a student can be able to

- propose mechanisms for Electrophilic Aromatic Substitution Reactions (EAS): halogenation, nitration, sulfonation, and Friedel-Crafts Alkylation & Acylation (sections 18.1 to 18.5)
- predict products and specify reagents for Electrophilic Aromatic Substitution Reactions (EAS): halogenation, nitration, sulfonation, and Friedel-Crafts Alkylation & Acylation (sections 18.1 to 18.5)
- draw resonance structures of the sigma complexes resulting from EAS rxns of substituted aromatic rings (sections 18.1 to 18.5)
- draw reaction energy diagrams for EAS reactions (sections 18.1 to 18.5)
- explain why substituents are activating or deactivating and o,p-directors or m-directors (section 18.6)
- list the major substituents in their EAS activation “pecking order” (section 18.6)
- predict the products of side chain reactions: oxidation of catechols and alkyl substituents, bromination of benzylic carbons,  $S_N^1$  and  $S_N^2$  rxns at the benzylic carbon, reduction of carbonyls, and reduction of nitro groups (sections 18.7 and 18.12)
- design multiple step syntheses that use substituent effects to create the desired isomers of multi-substituted aromatic compounds (sections 18.8 and 18.9)
- predict the products of Nucleophilic Aromatic Substitution Reactions (NAS): addition-elimination and elimination-addition (benzyne) (sections 18.10 and 18.11)
- propose mechanisms for Nucleophilic Aromatic Substitution Reactions (NAS): addition-elimination and elimination-addition (benzyne) (sections 18.10 and 18.11)

[18.1: Electrophilic Aromatic Substitution \(EAS\)](#)

[18.2: Halogenation of Benzene \(an EAS Reaction\)](#)

[18.3: Nitration of Benzene \(an EAS Reaction\)](#)

[18.4: Sulfonation of Benzene \(an EAS Reaction\)](#)

[18.5: Alkylation and Acylation of Benzene - The Friedel-Crafts EAS Reactions](#)

[18.6: Substituent Effects on the EAS Reaction](#)

[18.7: Side-Chain Reactions of Benzene Derivatives](#)

[18.8: Synthetic Strategies for Di-substituted Benzenes](#)

[18.9: Trisubstituted Benzenes - Effects of Multiple Substituents](#)

[18.10: Nucleophilic Aromatic Substitution - The Addition-Elimination Mechanism](#)

[18.11: NAS Reactions - the Elimination-Addition \(Benzyne\) Mechanism](#)

[18.12: Reduction of Aromatic Compounds](#)

[18.13: Additional Exercises](#)

[18.14: Solutions to Additional Exercises](#)

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