

Chapter 16: Reactions of Substituted Benzenes

Learning Objectives:

1. Be able to recognize and utilize the oxidative and reductive reactions involving the substituents on benzene.
2. Recognize whether a substituent on a benzene ring is activating or deactivating toward electrophilic aromatic substitution reaction, and why it is so.
3. Predict the effect a substituent will have on the regioselectivity of an electrophilic substitution reaction.
4. Predict the effect a substituent will have on pK_a .
5. Be able to design the synthesis of a multisubstituted benzene.
6. Be able to recognize and utilize the reactions involving arenediazonium salts.
7. Recognize and be able to write the mechanism of nucleophilic aromatic substitution.
8. Recognize the structure of benzyne, be able to explain how it is formed, and how it reacts.

Sections to be covered (in the order of delivery):

- 16.2 Reactions of Substituents on Benzene
- 16.3 The Effect of Substituents on Reactivity*
- 16.4 The Effect of Substituents on Orientation (Regioselectivity)*
- 16.5 The Effect Substituent on pK_a
- 16.6 The Ortho-para ratio
- 16.7 Additional Considerations Regarding Substituent Effects
- 16.8 Designing a Synthesis III: Synthesis of monosubstituted and Disubstituted benzenes*
- 16.9 Synthesis of Trisubstituted Benzenes
- 16.12 Mechanism for the Reaction of Amines with Nitrous Acid*
- 16.10 Synthesis of Substituted Benzenes Using Arenediazonium Salts*
- 16.11 The Arenediazonium Ion as an Electrophile*
- 16.13 Nucleophilic Aromatic Substitution Reactions*
- 16.14 Benzyne

* Sections that will be focused

Recommended additional problems

16.36 – 6.41, 6.43 – 6.55, 6.57 – 6.60, 6.62 – 6.68