

Elementary Organic Chemistry 220

Chapter 9 Review Aromatics

A) Nomenclature

- I) Monosubstituted Benzene Compounds
- II) Disubstituted Benzene Compounds
 - a) Use of ortho, meta, and para.
- III) Polysubstituted Benzene Derivatives
- IV) Benzene Ring as a Substituent
- V) Common Names

B) Resonance in Benzene

- I) Resonance Structures
- II) Molecular Orbital Picture of Benzene
- III) Structure of Benzene
- IV) Estimating Resonance Stabilization from Heats of Hydrogenation
- V) Huckel Rule
 - a) $4n + 2$ where $n = 0, 1, 2 \dots$

C) Electrophilic Aromatic Substitution

- I) Generalized Mechanism for Substitution
- II) Halogenation
- III) Nitration
- IV) Sulfonation
- V) Friedel-Crafts Alkylation
 - a) Mechanism
 - b) Other methods of generating carbocations
 - c) Problems with this method
 - i) polyalkylation
 - ii) carbocation rearrangement
- VI) Friedel-Crafts Acylation
 - a) General mechanism
 - b) Mechanism
 - c) Advantages
 - d) Clemmensen Reduction

D) Substituent Effects on Electrophilic Aromatic Substitution

- I) General Theory of Substituent Effects
- II) Electron Donating Groups
- III) Electron Withdrawing Groups
- IV) Classification of Substituents
- V) Multiply Substituted Aromatic Rings

E) Phenols

- I) Acidity of Phenols
- II) Electrophilic Substitution of Phenols
 - a) Problems
 - i) Ring Activation
 - ii) Phenols are Nucleophilic
- III) Notable Phenols

F) Chemistry of Aromatic Side Chains

- I) S_N1 Substitution
- II) Oxidation of Alkyl Side-Chain
- III) Alkenylbenzenes
- IV) Formation of Alkenylbenzenes

G) Heterocyclic Aromatic Compounds

H) Polycyclic Aromatics