Chapter 10

Understanding Strategies for Resolving a Carbocation When Aromaticity Must Be Restored

Key Concepts

An aromatic compound is significantly more stable than a non-aromatic one. Therefore, if an aromatic compound becomes non-aromatic when a carbocation forms, not only must the carbocation be resolved, but the molecule must also be made aromatic again. This is done by sharing sigma bond electrons with the carbocation so that a new pi bond is formed. Because hydrogen ends up being replaced by an electrophile, this is classified as an electrophilic aromatic substitution reaction.

When an atom attached to a benzene ring has a negative or partial negative charge, it is an *ortho/para* director in an electrophilic aromatic substitution reaction. When it has a positive or partial positive charge, it is a *meta* director. All *meta* directors withdraw electrons from the ring and are deactivators. *Ortho/para* directors are generally activating, except for halogens, which are weakly deactivating.

What You Need to Learn, Understand, and Apply

1. **How to determine if a cyclic portion of a molecule is aromatic, non-aromatic, or anti-aromatic**
2. **A working knowledge of the relative stabilities of aromatic, non-aromatic, and anti-aromatic compounds.**
3. **The reason why a catalyst is required for an electrophilic aromatic substitution reaction.**
4. **How to identify benzylic and aryl carbons/hydrogens as well as the *ortho*, *meta*, and *para* positions of a benzene ring.**
5. **How to predict where any given group attached to a benzene ring will direct the addition of a reactant in an electrophilic aromatic substitution reaction.**
6. **Which directors are activating and which are deactivating in an electrophilic aromatic substitution reaction.**
7. **How to assign a common name and draw the structure of any given monosubstituted, disubstituted, or trisubstituted benzene compound.**
8. **The skills needed to apply concepts related to reacting and naming benzene derivatives.**