

Massachusetts Institute of Technology

Organic Chemistry 5.13

Assignment and Study Guide for Unit III

Molecular Orbital Theory I Aromatic and Antiaromatic Compounds

“...I was sitting, writing at my textbook, but the work did not progress; my thoughts were elsewhere. I turned my chair to the fire and dozed. Again the atoms were gambolling before my eyes. This time the smaller groups kept modestly in the background. My mental eye, rendered more acute by repeated visions of the kind, could now distinguish larger structures, and twisting in snake-like motion. But look! What was that? One of the snakes had seized hold of its own tail, and the form whirled mockingly before my eyes. As is by a flash of lightning I awoke; and this time I spent the rest of the night in working out the consequences of the hypothesis.

August Kekule (1829-1896)

Reading

Wade Chapter 15

Chapter 16

Assignments

Review Chapter 17 - We will summarize the most important material in class.

Recommended Problems

Chapter 15 13, 19, 20, 30, 32, 33, 35, 37

Chapter 16: 5, 7-10, 12-17, 22, 27-28, 30-33, 35-36.

Molecular Orbital Theory I
Aromatic and Antiaromatic Compounds

Study Guide

General Aims of this Unit:

1. We will develop a qualitative understanding of the molecular orbital basis of **Hückel's Rule**.
2. We will learn how to apply Hückel's rule and thus recognize **aromatic** and **antiaromatic** compounds (both carbocyclic and heterocyclic).
3. We will discuss the **consequences of Hückel's Rule** and make predictions as to the physical (e.g. spectroscopic) and chemical properties of aromatic and antiaromatic compounds.
4. We will discuss **electrophilic aromatic substitution reactions**. We will learn how to evaluate the relative reactivity of different aromatic compounds and how to predict the regiochemical outcome of reactions of substituted systems. E.A.S. reactions of **carbocyclic** compounds will be reviewed, and those of **heterocyclic** compounds will be discussed in more detail.