University of Baghdad
College of Science for Women
Department of Chemistry

Organic Chemistry 2

Second stage

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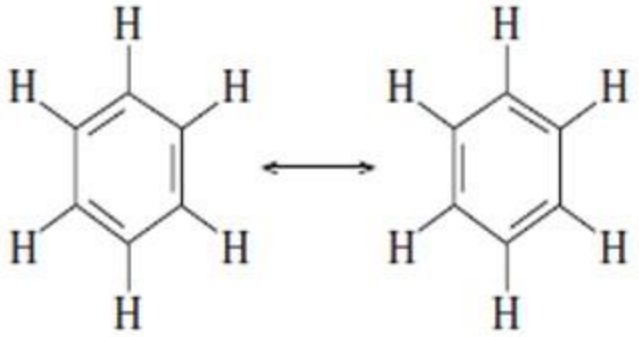
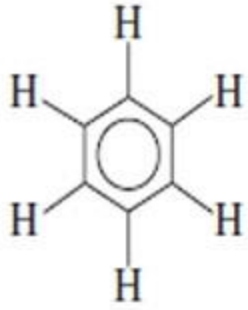
Aromatic compounds:

Are compounds that consist of one or more rings that contain alternating single and double bonds in its chemical structure (i.e. conjugated double bond). In 1825, Michael Faraday isolated a hydrocarbon called benzene, which had the molecular formula [C_6H_6]. A molecule of benzene consists of a ring of six carbon atoms with one hydrogen atom attached to each carbon.

Many compounds that contain benzene ring have fragrant odors, that's why family of benzene compounds known as aromatic compounds



Structures for benzene

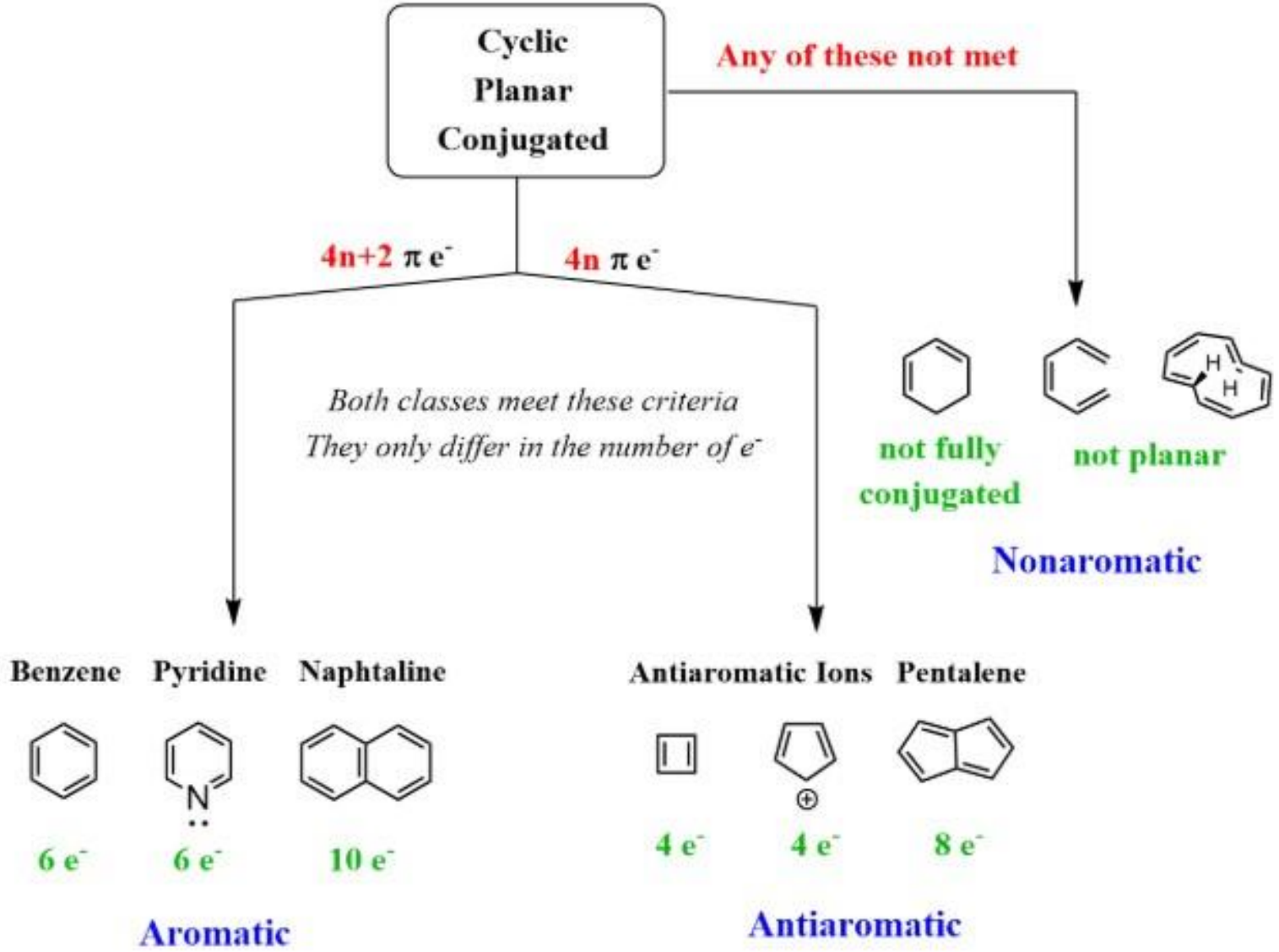


Skeletal formula for benzene ring

Characteristics of aromatic compounds:

1. **A delocalized conjugated π system.**
2. **Coplanar structure.**
3. **Atoms arranged in one or more rings.**
4. **Obeys Huckel ’s rule.**

Classification of Aromatic, Antiaromatic and Nonaromatic Compounds

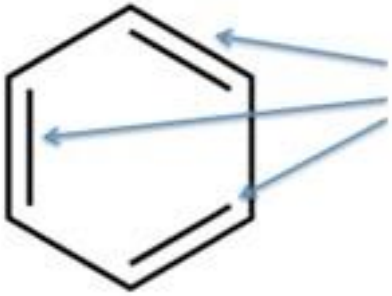


Huckel's Rule:

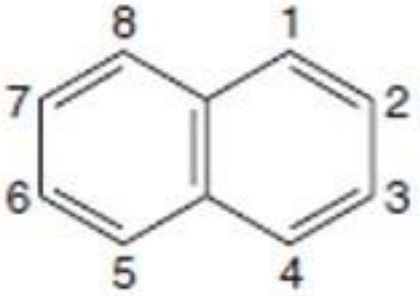
We saw that there are double bonds in the ring that is present in the chemical structure of aromatic compounds. These double bonds contain electrons called 'pi electrons' The number of (pi) electrons is very important in determining if the compound obeys Huckel's Rule or not.

➢ Huckel's Rule states that an aromatic compound must have a certain number of (pi) electrons. The number of pi electrons must be equal to (4n+2), where n is equal to zero or any positive integer (n = 0, 1, 2,3,…etc.)

Benzene



3 double bonds = 6 pi electrons



Naphthalene

$C_{10}H_8$

Huckel's rule:

$4n + 2 = \text{pi electrons}$

$4n + 2 = 6$

$4n = 4$

$n = 1$

Huckel's rule:

$4n + 2 = \text{pi electrons}$

$4n + 2 = 10$

$4n = 8$

$n = 2$