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Editorial

Editorial Highlights on Aromatic Compounds

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EDITORIAL

Aromatic compound, any of a broad class of unsaturated chemical compounds with one or more planar rings of atoms bound by two forms of covalent bonds. Aromaticity refers to the peculiar stability of these compounds. Although the word aromatic originally referred to odour, it is now only used in chemistry to refer to compounds with complex electronic, chemical, or physical properties. Chemical or structural properties Aromaticity is caused by complex bonding structures that allow some (pi) electrons to be strongly retained within a molecule. Aromaticity is associated with low reactivity and is often expressed in lower than predicted heats of combustion and hydrogenation.

Aromatic compounds, such as benzene and naphthalene, are a class of organic compounds that play an important role in organic chemistry. The scope of this chapter does not allow for a thorough discussion of aromatic compounds and aromaticity, but here are the key points.

A benzene ring or a structure identical to it can be found in almost all aromatic compounds. What is the cause of benzene's unique reactivity and characteristic stability? Several general criteria must be met if a molecule is to be aromatic.

A cyclic molecule must be aromatic. A planar aromatic molecule is needed. Only sp^2-hybridized atoms that can form a delocalized system of molecular orbitals can be found in an aromatic ring. In the delocalized scheme, the number of electrons must equal 4n + 2, where n is an integer.

E. Huckel suggested the "4n + 2 rule," which is known as the Huckel rule. This text does not cover the theoretical underpinnings of this law. However, cyclic systems with 6 (n=1), 10 (n=2), and 14 (n=3) electrons are aromatic, according to the Huckel law. For n=1, benzene meets the aromaticity criterion. In the following section, we'll look at examples for different 6, 10, and 14 electron systems. Aromatic compounds can also contain atoms other than carbon, as we'll see.

Aromaticity is not present in some cyclic polyenes with alternating single and double bonds. The Huckel law does not apply to these compounds. Cyclobutadiene (four electrons) and cyclooctatetraene (eight electrons) are two examples. Both compounds undergo the types of addition reactions we've discussed and have none of the properties of benzene.

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