On the π-Electron Content of Bonds and Rings in Benzenoid Hydrocarbons

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The Pauling bond order can be viewed as a measure of the π-electron content of the respective carbon-carbon bond. In benzenoid hydrocarbons its values lie between 0 (in the case of essential single bonds) and 1 (in the case of essential double bonds). If the benzenoid molecule does not possess essential single and double bonds, then the Pauling bond orders are greater than 0 and less than 1, but may assume values arbitrarily close to 0 and 1. The π-electron content of a ring is equal to the sum of the π-electron contents of the carbon-carbon bonds forming this ring. We show that in benzenoid hydrocarbons the π-electron content of any (six-membered) ring lies between 0 and 5.5. If the molecule does not possess essential single and double bonds, then the π-electron content of any ring is greater than 0 and less than 5.5, but may assume values arbitrarily close to 0 and 5.5.

Key words: Pauling Bond Order; Benzenoid Hydrocarbons; π-Electron Content (of a Carbon-Carbon Bond); π-Electron Content (of a Ring).