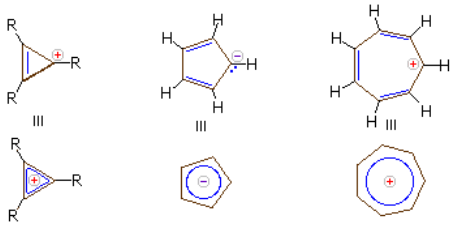
17.6: AROMATIC IONS - A CLOSER LOOK

Cyclic anions and cations can be aromatic if they follow Huckel's Rule. Since aromatic ions have increased stability, it is important to recognize their formation when predicting reaction products.

CHARGED AROMATIC COMPOUNDS

Carbanions and carbocations may also show aromatic stabilization. Some examples are:

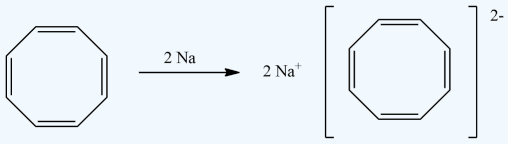


The three-membered ring cation has 2 π-electrons and is surprisingly stable, considering its ring strain. Cyclopentadiene is as acidic as ethanol, reflecting the stability of its 6 π-electron conjugate base. Salts of cycloheptatrienyl cation (tropylium ion) are stable in water solution, again reflecting the stability of this 6 π-electron cation.

Exercise

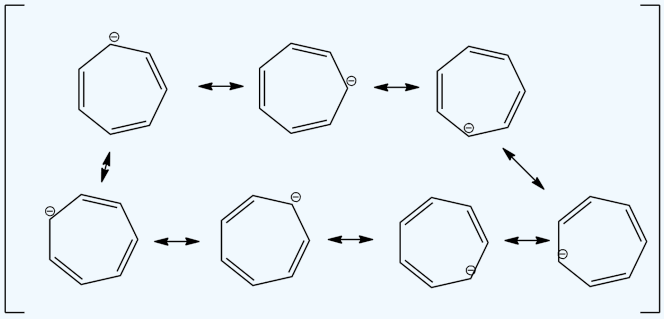
4. Draw the resonance structures for cycloheptatriene anion. Are all bonds equivalent? How many lines (signals) would you see in a H^1 C^{13} NMR?

5. The following reaction occurs readily. Propose a reason why this occurs?



Answer

4. All protons and carbons are the same, so therefore each spectrum will only have one signal each.



5. The ring becomes aromatic with the addition of two electrons. Thereby obeying the 4n+2 rule.

CONTRIBUTORS AND ATTRIBUTIONS

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