

PHARMACEUTICAL ORGANIC CHEMISTRY-II- BP301T

UNIT: 1 Benzene and its derivatives

CLASS: 10

TOPIC: Resonance energy of benzene:

The resonance energy of a compound is a measure of the extra stability of the conjugated system compared to the corresponding number of isolated double bonds. This can be calculated from experimental measurements.

The diagram shows the experimental heats of hydrogenation, ΔH_h , for three molecules, benzene, 1,3-cyclohexadiene and cyclohexene. These are related in that under appropriate conditions that can all be reduced to the same product, cyclohexane.

The ΔH_h for "cyclohexatriene", a hypothetical molecule in which the double bonds are assumed to be isolated from each other, is calculated to be 3 times the value for cyclohexene. This value reflects the energy we could expect to be released from 3 isolated C=C.

By comparing this value with the experimental value for benzene, we can conclude that benzene is 152 kJ or 36 kcal / mol more stable than the hypothetical system. This is the resonance energy for benzene.

