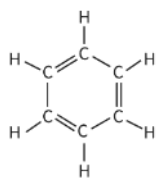


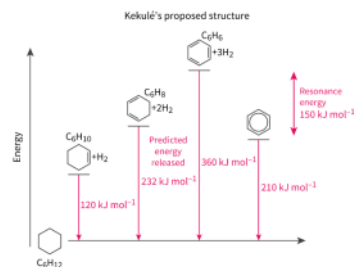
# Benzene, Ozone, carbonate

Thursday, 29 February 2024 2:02 pm



There's evidence that can show the Benzene does not behave like a molecule with single and double bonds (which single and double bond do not exist in resonance - all the bond length in resonance are same)

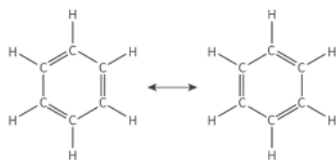
- Physics evidence
  - o All bond length and angles are the same
  - o Molecular geometry of each carbon atom is trigonal planar
- Chemical evidence
  - o Benzene is more stable than expect
    - Compare to other, it require much more energy to have hydrogenation reaction
      - carbon-carbon double bond in a molecule broken and H<sub>2</sub> molecule is add to the molecule
- Chemical reaction: Benzene does not undergo the reactions expect for a molecule with double bonds



Summary :

1. The C-C bond lengths are all the same length, with the same bond angle.
2. Benzene is more stable than expected due to resonance energy ( $-150 \text{ kJ mol}^{-1}$ ).
3. Benzene is reluctant to undergo addition reactions and prefers substitution reactions

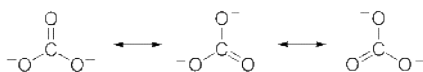
Benzene as resonance structure



Other resonance example:  
Ozone:



Carbonate:



Experimental evidence indicates that benzene is best represented by a resonance hybrid structure. This resonance structure does not contain electrons in alternating single and double bonds. Instead, the electrons are delocalized ✓ and form a ring above and below the plane.