

OCR (B) Chemistry A-Level

CD2 - Organic Functional Groups

Flashcards

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What do fats and oils mostly consist of?



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Fats and oils mostly consist of a mixed combination of esters (with varying degrees of unsaturation) of propane-1,2,3-triol.



What is an arene?



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- An aromatic hydrocarbon.
- Aromatic generally means that the compound contains a benzene ring.



How do electrons behave in arenes?



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Electrons are delocalised i.e. not belonging to a particular atom or covalent bond.



What properties arise from arenes having delocalised electrons?



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- Electrophiles are attracted to the aromatic ring system as it is a region of high electron density.
- The aromatic ring system is very stable - therefore arenes are unable to undergo addition reactions but can undergo slow substitution reactions.

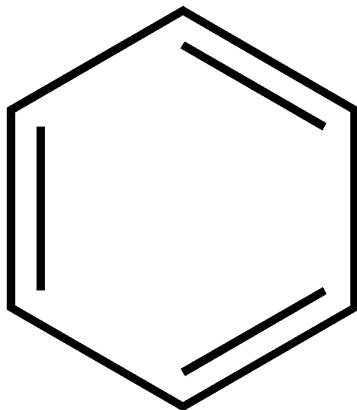


What are the two common representations of benzene?

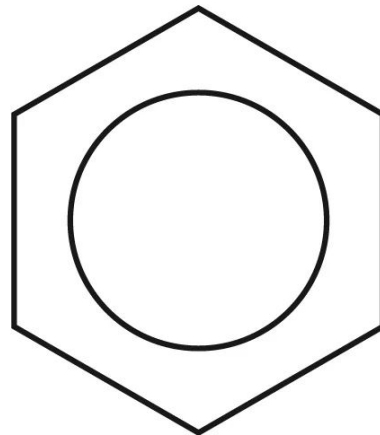


What are the two common representations of benzene?

The Kekulé model



The delocalised model



What does the Kekulé model of benzene say about its bonding?



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- Molecular formula: C_6H_6 .
- 6 carbon atoms arranged in a hexagonal ring joined by alternative single and double bonds.
- Each carbon atom is bonded to a hydrogen atom via a single σ bond.



What is the bonding like in the delocalised model of benzene?



What is the bonding like in the delocalised model of benzene?

- Molecular formula C_6H_6 .
- 6 carbon atoms arranged in a hexagonal ring.
- Each carbon atom uses an electron to bond to a hydrogen atom, and then 2 more electrons to form σ bonds with the carbon atoms either side of it.
- Each carbon has 1 spare electron in its p-orbital. These p-orbitals overlap sideways, above and below the plane of the carbon atoms.
- This forms a system of π bonds that is spread across the entire structure- a ring of delocalisation/electron density.



What do the two models of benzene suggest about its enthalpy change of hydrogenation?



What does Kekulé's model of benzene suggest about its enthalpy change of hydrogenation?

- If the Kekulé model of benzene was correct then its enthalpy change of hydrogenation would be -360 kJ mol^{-1} (3 times that of cyclohexene).
- However the enthalpy change of hydrogenation of benzene is actually -208 kJ mol^{-1} , it is less exothermic than expected.
- This suggests the Kekulé model is unlikely to be correct.

