PHARMACEUTICAL ORGANIC CHEMISTRY-II- BP301T

UNIT: 4 Polynuclear hydrocarbons

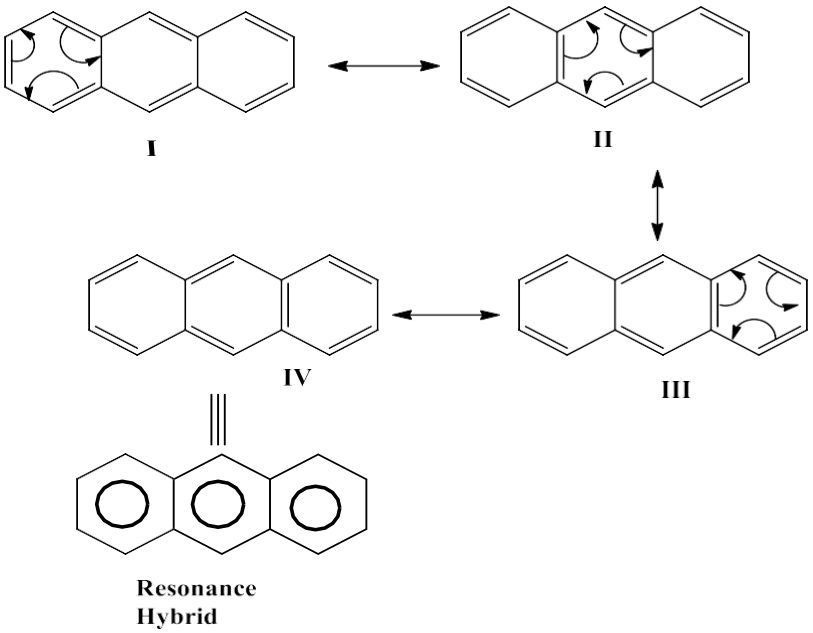
CLASS: 4

TOPIC: Anthracene

Chemical Properties

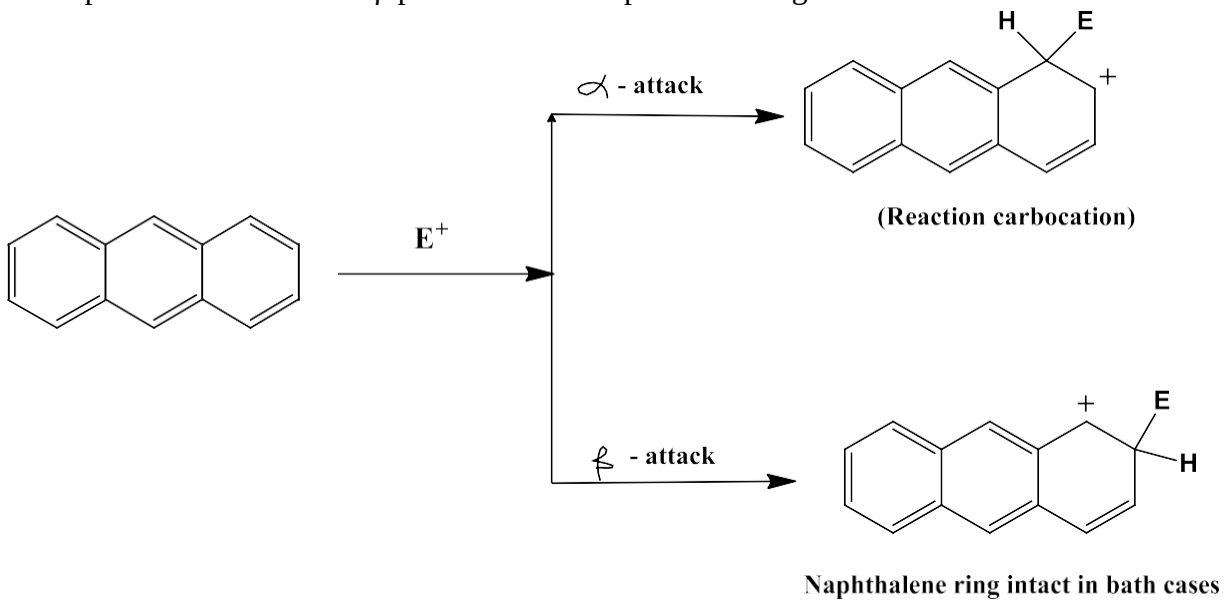
1. Anthracene is a well known aromatic compound. It has cyclic, Planner structure and follow Huckel's rule having total no. of $14\pi e^-$ (n=3).

2. **Resonating structure**



3. Electrophillic substitution reaction

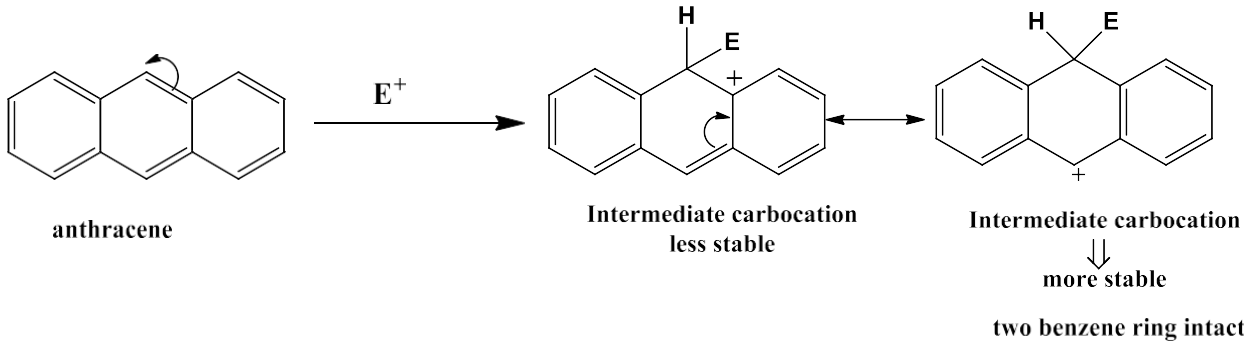
- Anthracene is aromatic in nature and hence undergo characteristics reactions of aromatic reaction i.e. electrophillic substitution reaction.
- There are three different positions in this compound, where, monosubstitution can be take place, α, β, γ. This can be decided on the basis of loss in resonance energy in substitution on the three positions.
- Electrophillic attack on α and β positions left a naphthalene ring intact.

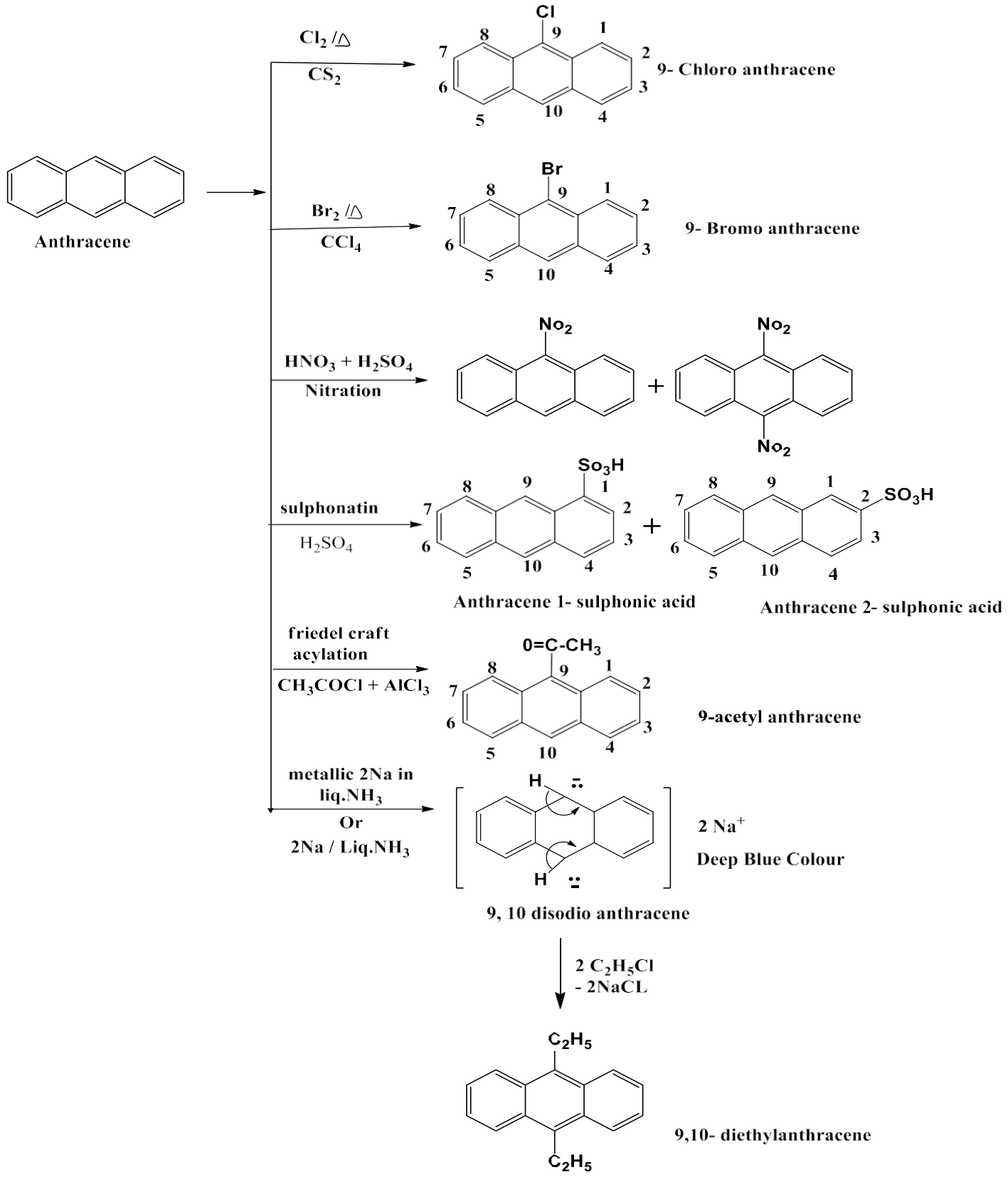


The resonance energy of anthracene = 351.5 KJ/mol

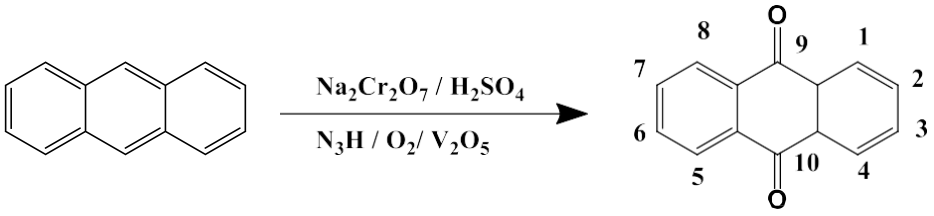
- The resonance energy of naphthalene is 255.2 KJ/mol so in α and β substitution the loss in resonance energy is = Resonance energy of anthracene – Resonanace energy of naphthalene
  = 351.5 – 255.2
  = 96.8 KJ/mol

Electrophillic attack on γ position



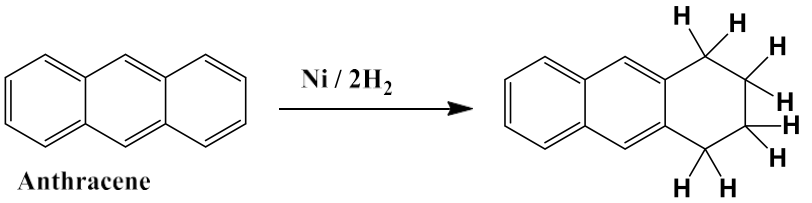

Anthracene
Cl2 /△
CS2
9- Chloro anthracene
Br2 /△
CCl4
9- Bromo anthracene
HNO3 + H2SO4
Nitration
No2
No2
No2
sulphonatin
H2SO4
So3H
SO3H
Anthracene 1- sulphonic acid
Anthracene 2- sulphonic acid
friedel craft
acylation
CH3COCl + AlCl3
0=C-CH3
9-acetyl anthracene
metallic 2Na in
liq.NH3
Or
2Na / Liq.NH3
2 Na+
Deep Blue Colour
9, 10 disodio anthracene
2 C2H5Cl
- 2NaCL
C2H5
C2H5
9,10- diethylanthracene

4. Oxidation reaction



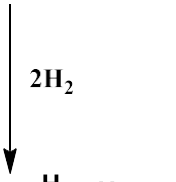
9,10- anthraquinone

5. Reduction

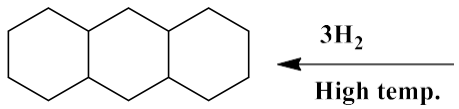


Anthracene

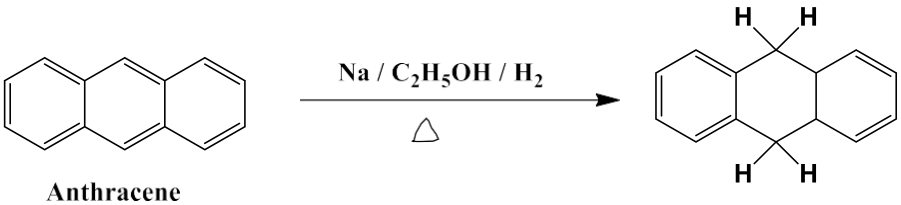
1,2,3,4 tetrahydroanthracene



1,2,3,4,5,6,7,8 octahydro anthracene



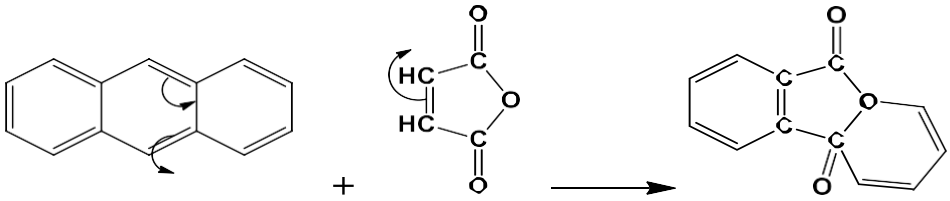
perhydroanthracene
($C_{14}H_{24}$)



Anthracene

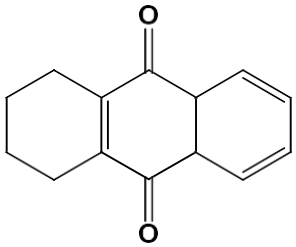
9,10- dihydroanthracene

6. Diel's Alder Reaction



Anthracene Derivatives

i) 9,10 anthraquinone (anthraquinone)



ii) Alizarin