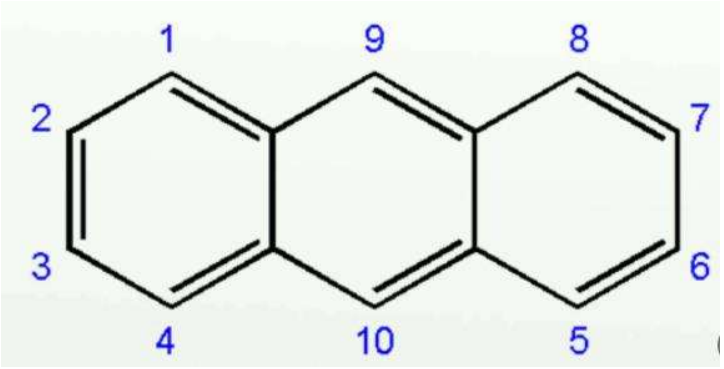
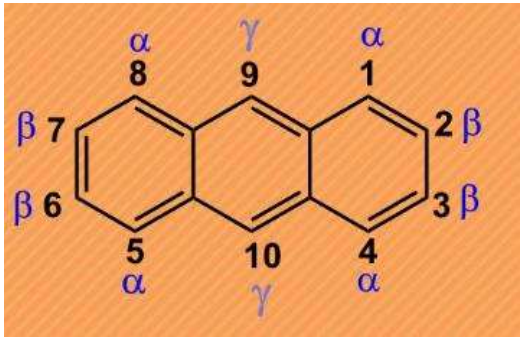
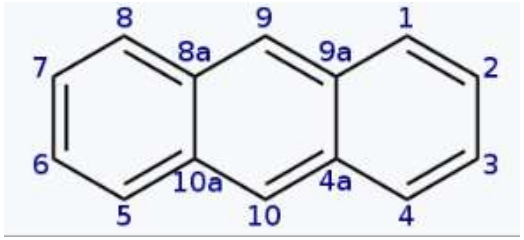
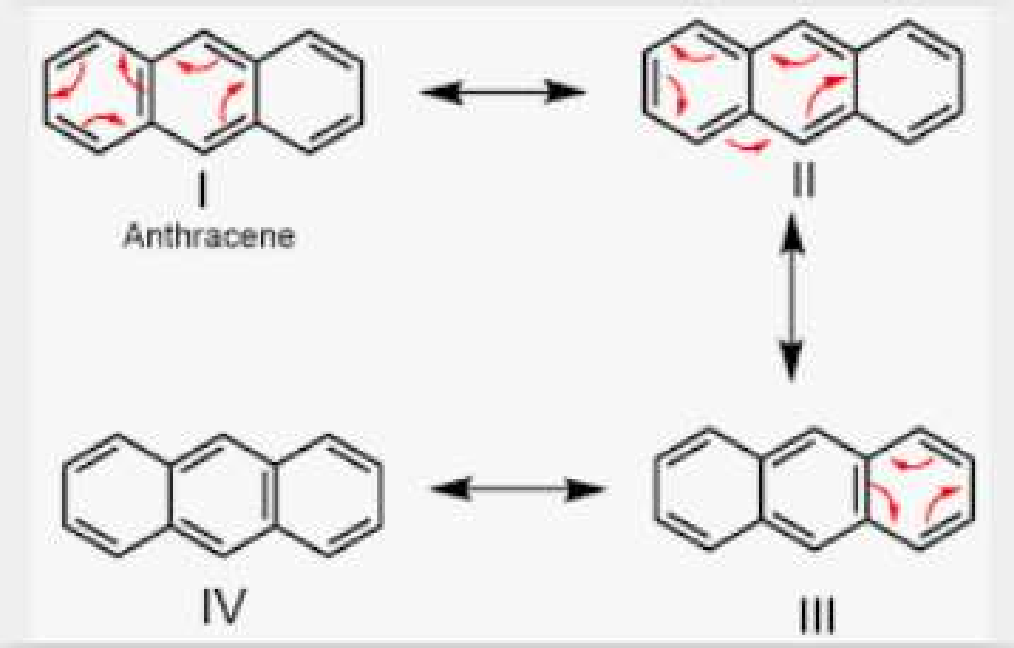
Anthracene


1
9
8
2
7
3
6
4
10
5


α
γ
α
8
9
1
β 7
2 β
β 6
3 β
5
10
4
α
γ
α


8
9
1
8a
9a
7
2
6
3
10a
4a
5
10
4

Resonance in Anthracene

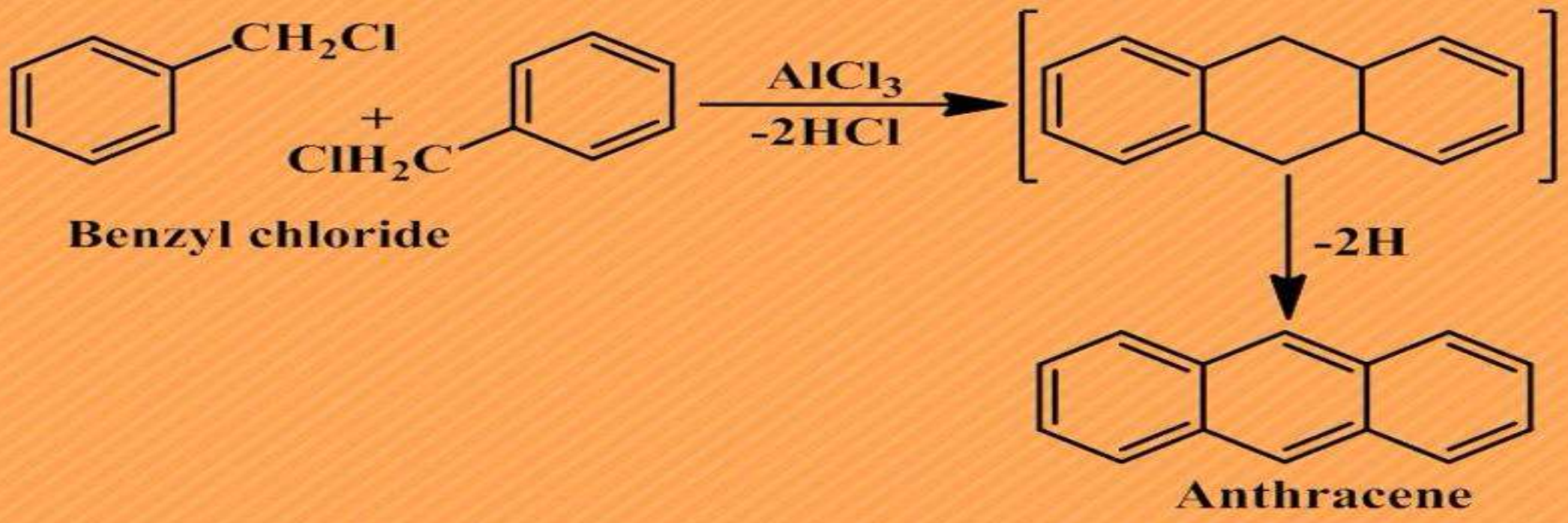


Resonance energy 84 kcal mol^{-1}, average 28, less aromatic than benzene

Synthesis of anthracene

(i) By Friedel Crafts reaction

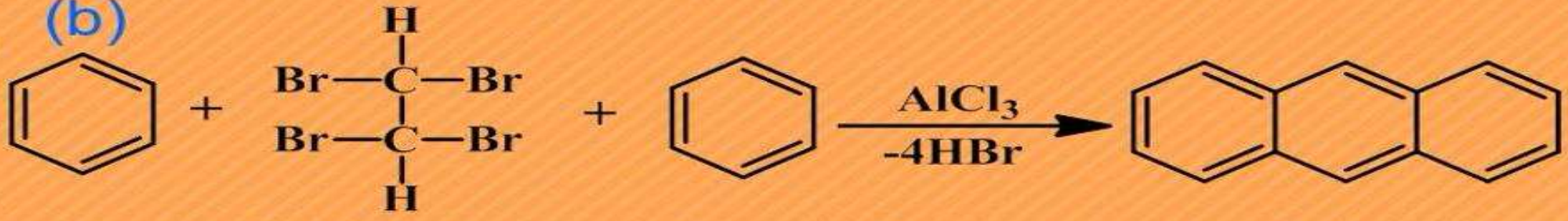
(a)



Benzyl chloride

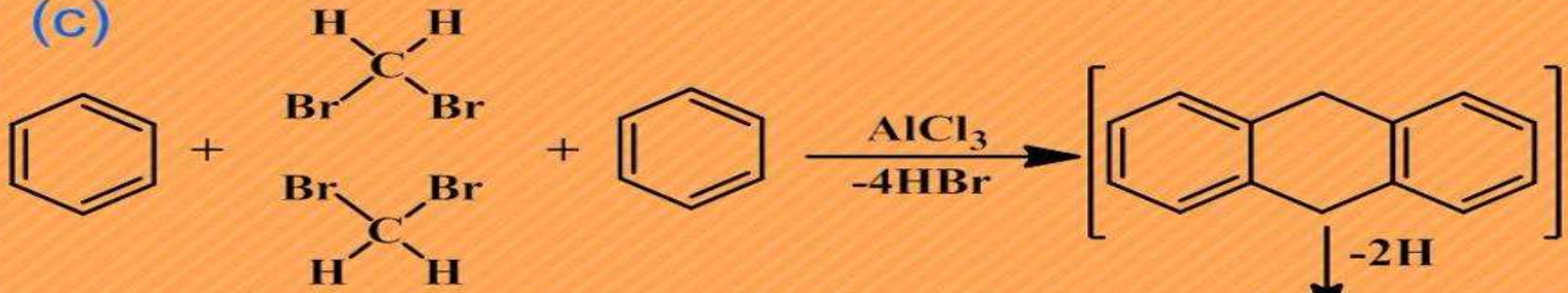
Anthracene

(b)



Acetylene tetrabromide

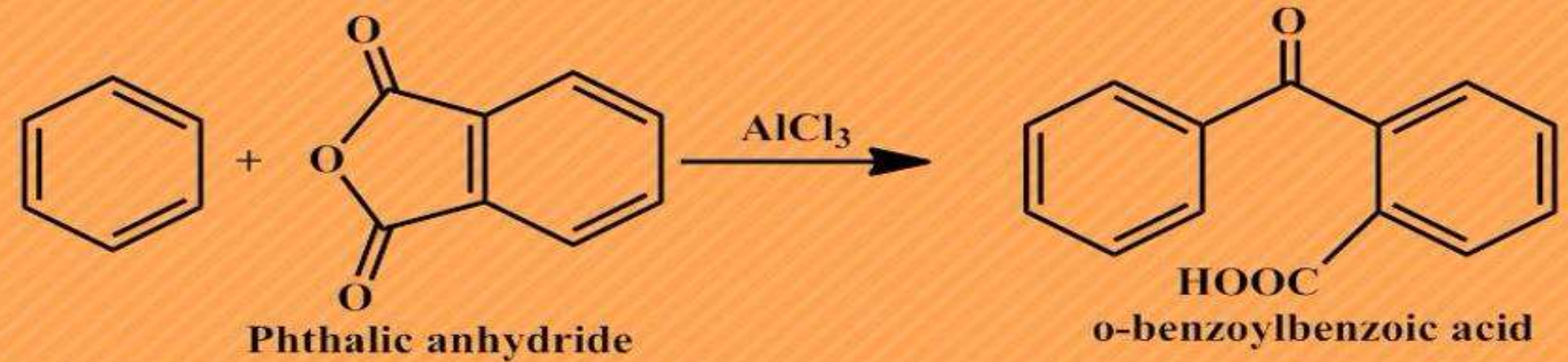
(c)

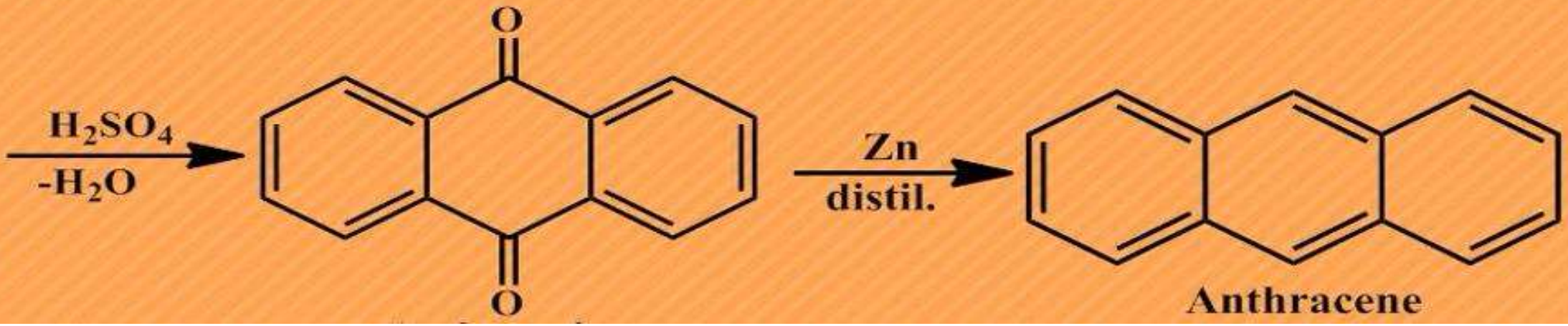


Methylenedibromide

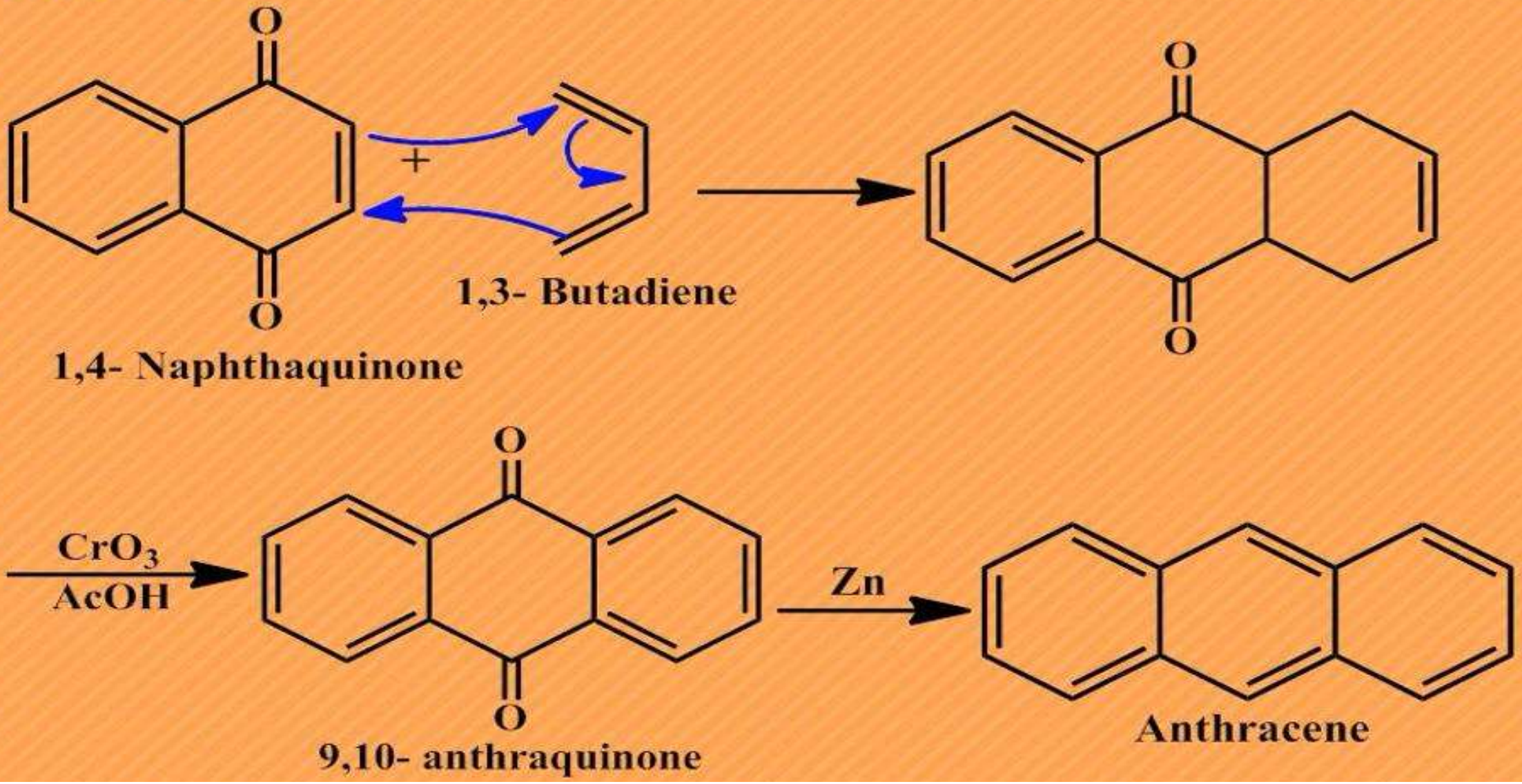
Anthracene

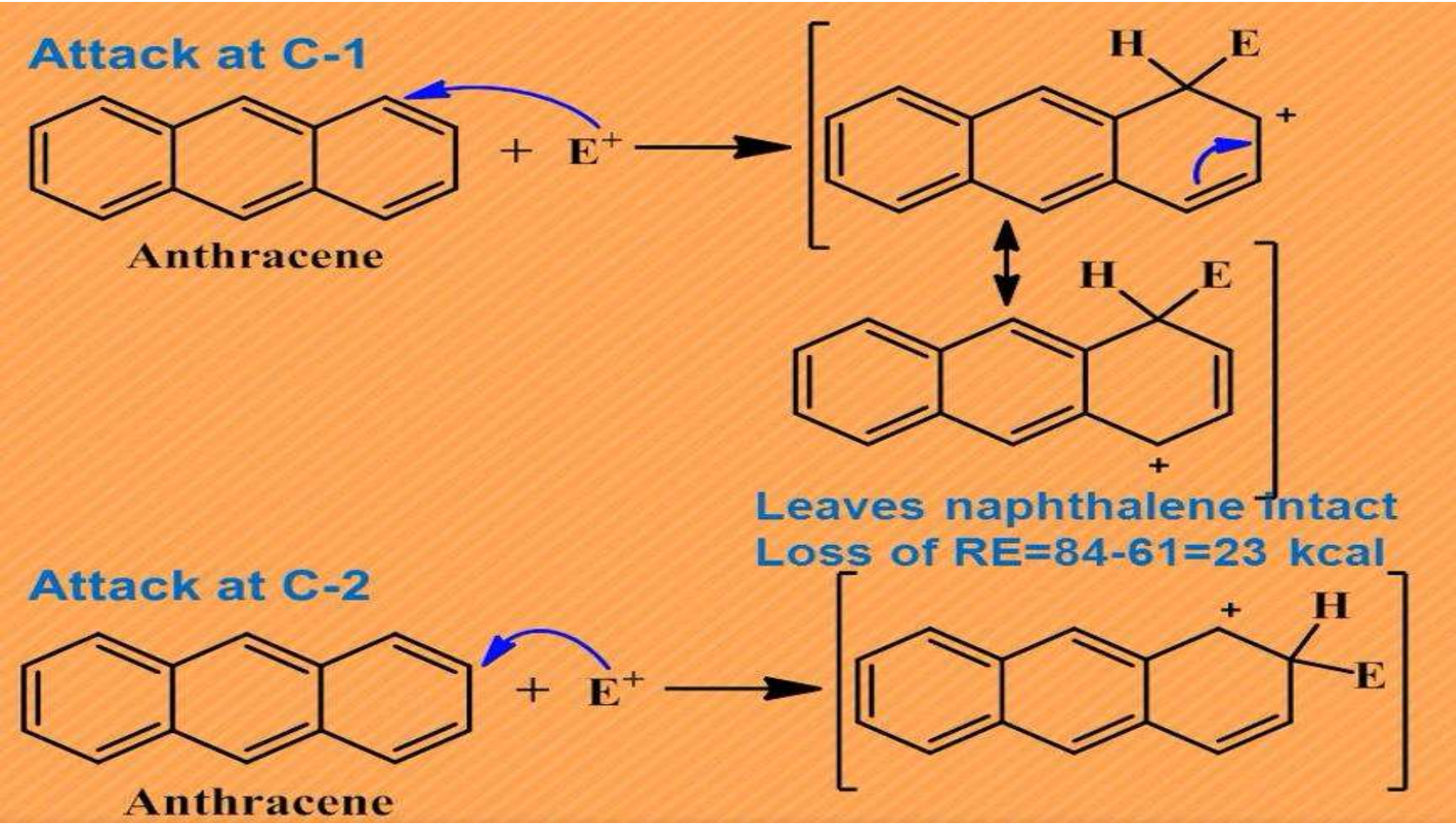
(ii) By Haworth synthesis

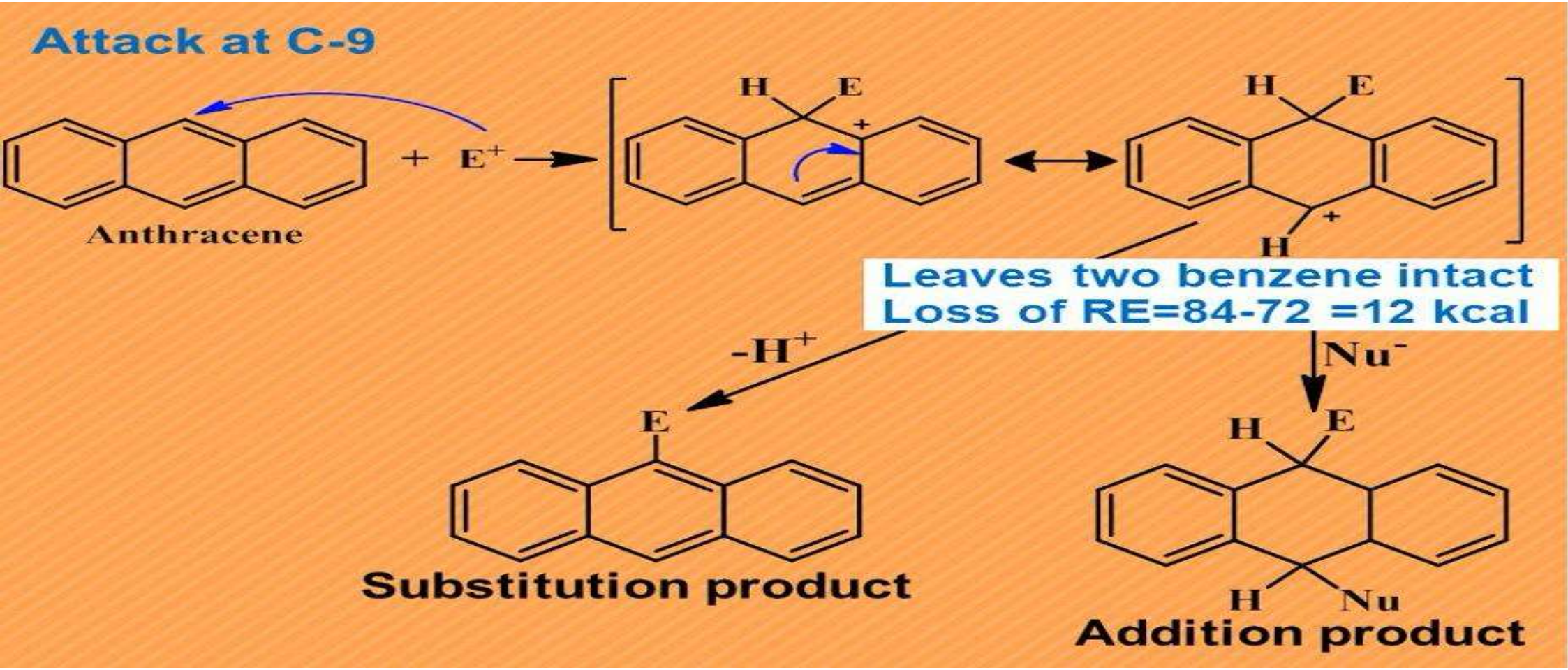




(iii) By Diels-Alder reaction

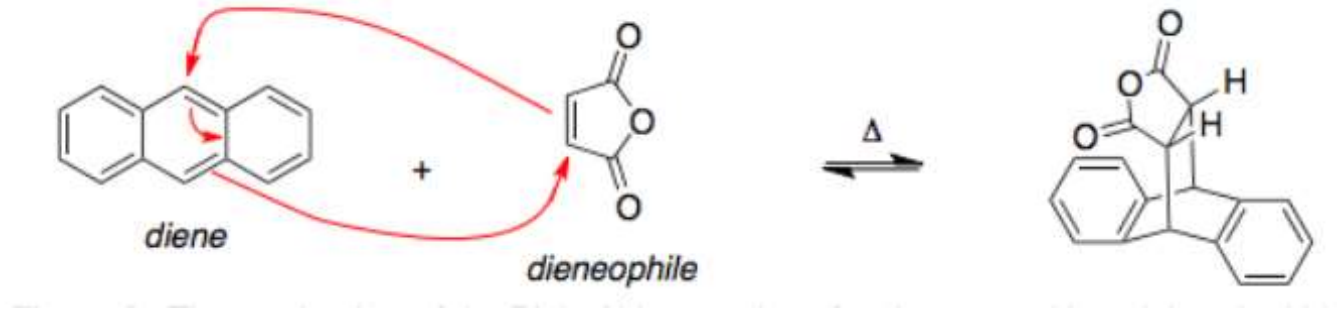


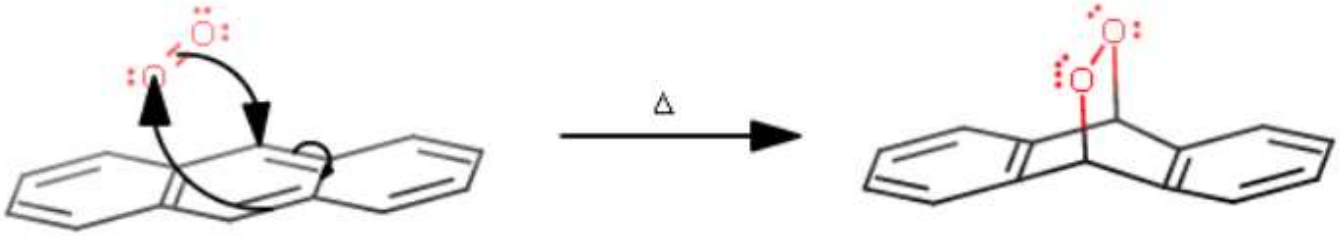

Attack at C-1
Anthracene
+ E+
H
E
+
H
E
+
Leaves naphthalene intact
Loss of RE=84-61=23 kcal
Attack at C-2
Anthracene
+ E+
+
H
E

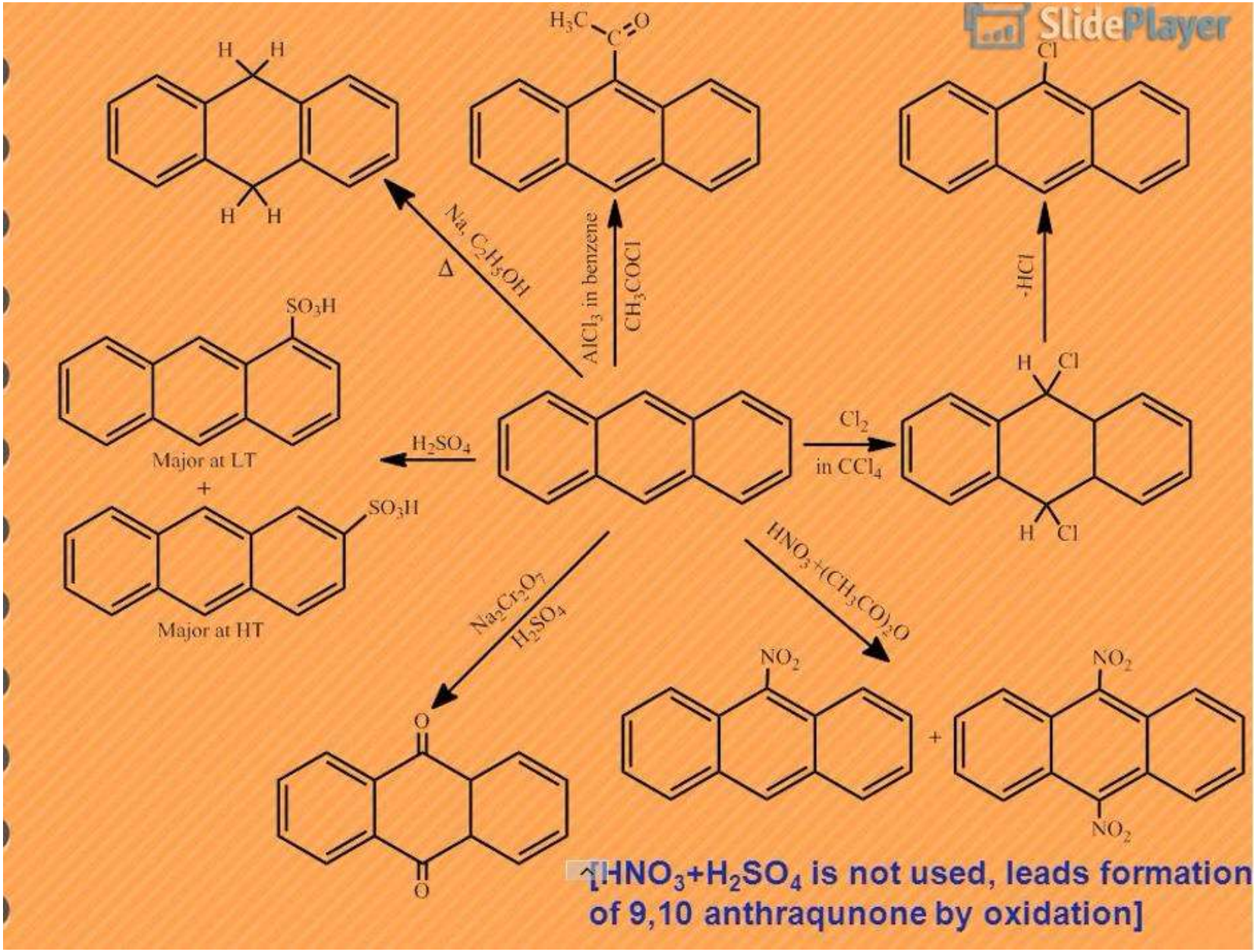


The attack at 1-. 2- position forms a carbocation having a naphthalene moiety whereas attack at 9-position forms a carbocation with two benzene rings. The resonance stabilization in the latter will be more since the total resonance energy of two benzene rings is greater than that of a naphthalene molecule.

Chemical Reactions






H H
H H
H3C C O
Cl
Na, C2H5OH
Δ
AlCl3 in benzene
CH3COCl
-HCl
SO3H
Major at LT
+
SO3H
Major at HT
H2SO4
Cl2
in CCl4
H Cl
H Cl
Na2Cr2O7
H2SO4
HNO3+(CH3CO)2O
NO2
NO2
NO2
+
O
O
[HNO3+H2SO4 is not used, leads formation of 9,10 anthraqunone by oxidation]