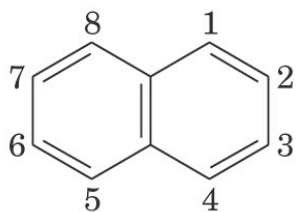


Konposatu Aromatiko Polinuklearrak

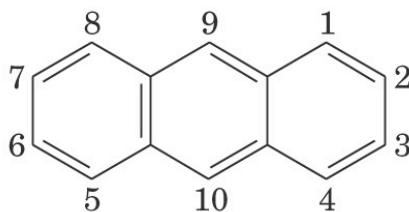
◆ Beste Zenbait Konposatu Aromatiko

● Konposatu Bentzenoide Aromatikoak

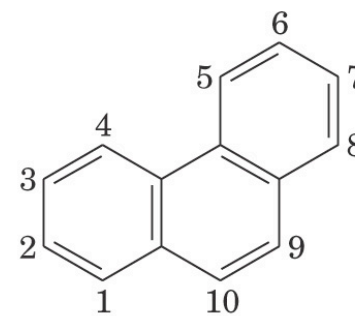
➔ Konposatu bentzenoide aromatikoek bi edo gehiago eraztun bateratuak dituzte



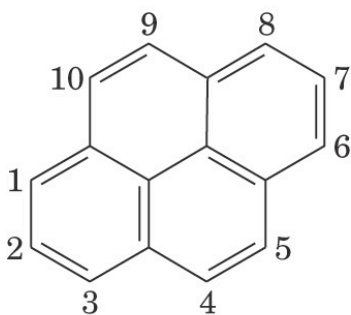
Naphthalene
 $C_{10}H_8$



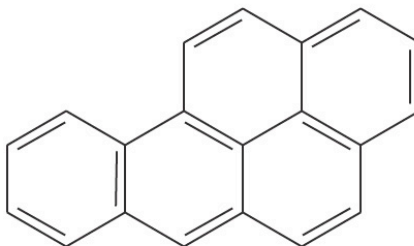
Anthracene
 $C_{14}H_{10}$



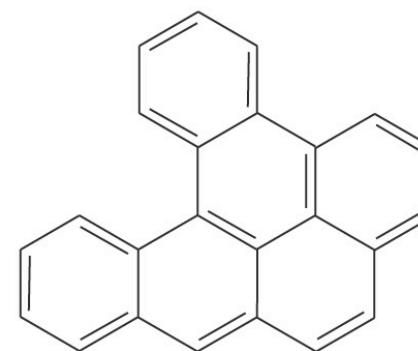
Phenanthrene
 $C_{14}H_{10}$



Pyrene
 $C_{16}H_{10}$



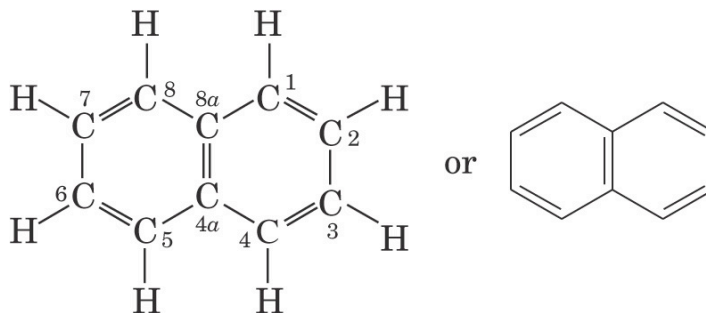
Benzo[a]pyrene
 $C_{20}H_{12}$



Dibenzo[a,l]pyrene
 $C_{24}H_{14}$

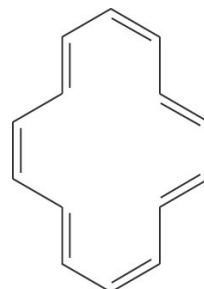
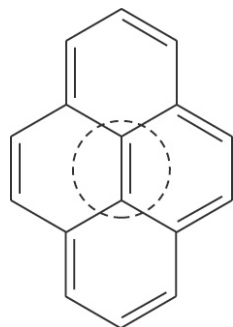
➔ **Naftalenoa hiru erresonantzi-egiturez azal daiteke**

- ★ Egiturretan garrantzitsuenak (ekarpen handiena duena) azaltzen da behean
- ★ Kalkulok adierazten dute naftalenoaren 10 π elektroiak deslokalizaturik daudela erresonantzi-energia dextente agertuz

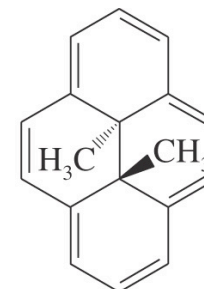


➔ **Pirenoak 16 π elektroi ditu, hala ere aromatikotzat hartzen da**

- ★ Erdiko lotura bikoitza aintzakotzat hartu gabe 14 π elektroi ditu, aromatikoa den [14]anulenoaren antza hartuz



[14]Annulene



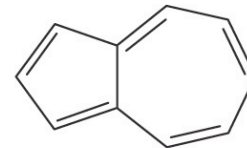
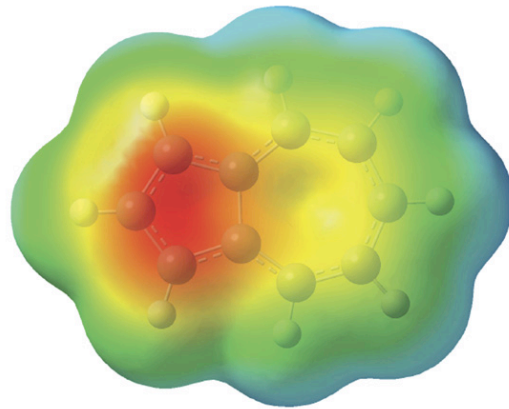
trans-15,16-Dimethyldihydropyrene

- **Konposatu Ez-Bentzenoide Aromatikoak**

- ➔ **Hauek ez dute bentzenoren eraztunik ageri**

- ★ Adibidez, ziklopentadienilo anioia eta anuleno aromatikoak ([6] anulenoa ezik)

- ➔ **Azulenoak erresonantzi-energia handia du (baita karga-banaketa handia ere, mapa elektostatikoan ageri denez)**



Azulene

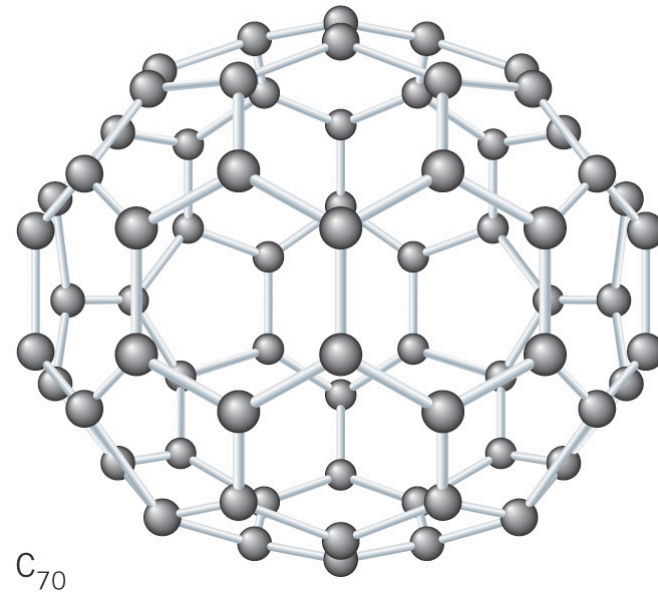
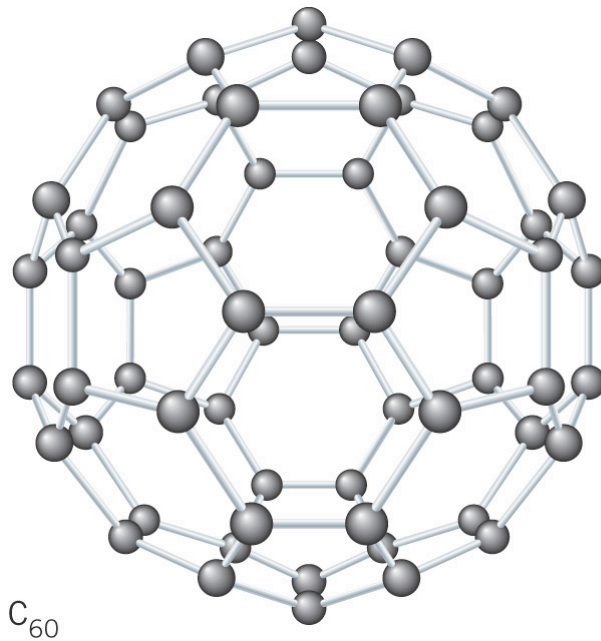
● Fullerenokoak

➔ Buckminsterfullerenoa, C_{60} , futbol baloiaren itxura du, karbonozko pentagonoz eta hexagonoz osatua

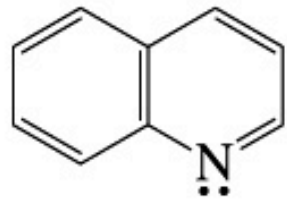
★ Karbono bakoitzak sp^2 hibridazioa du eta beste 3 karbonori lotua dago

★ Buckminsterfullerenoa aromatikoa da

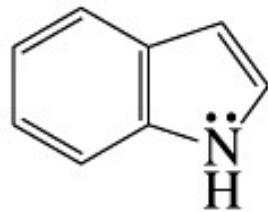
➔ “Buckybaloi” antzekoak sintetizatu dira (adibidez C_{70})



Konposatu Aromatiko Heteroziklikoak



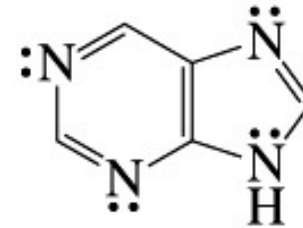
quinoline



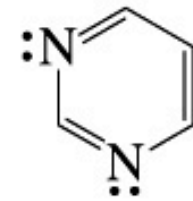
indole



imidazole

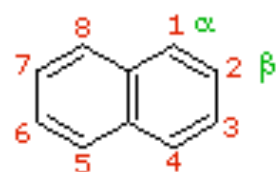


purine

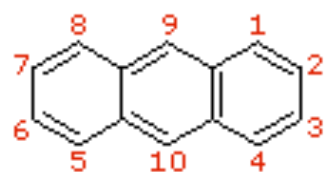


pyrimidine

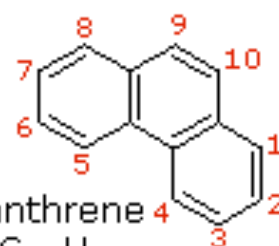
Hidrokarbuo Polizikliko Bentzenoideak



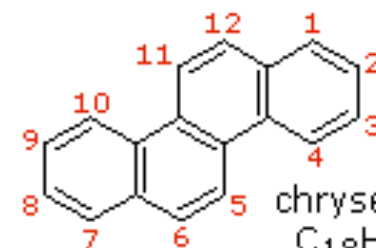
naphthalene
 $C_{10}H_8$
m.p. $81^{\circ}C$



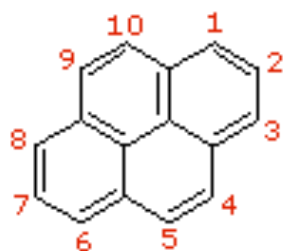
anthracene
 $C_{14}H_{10}$
m.p. $217^{\circ}C$



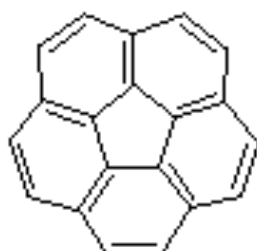
phenanthrene
 $C_{14}H_{10}$
m.p. $100^{\circ}C$



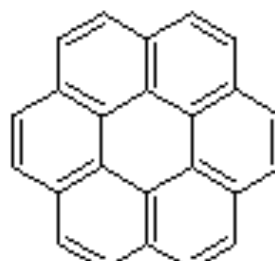
chrysene
 $C_{18}H_{12}$
m.p. $253^{\circ}C$



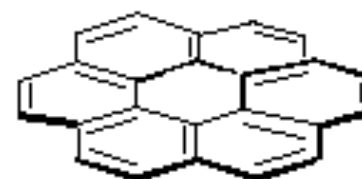
pyrene
 $C_{16}H_{10}$
m.p. $150^{\circ}C$



corannulene
 $C_{20}H_{10}$
m.p. $268^{\circ}C$

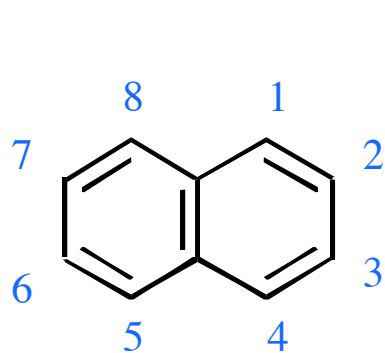


coronene
 $C_{24}H_{12}$
m.p. $442^{\circ}C$

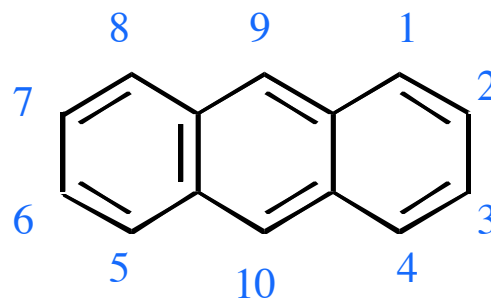
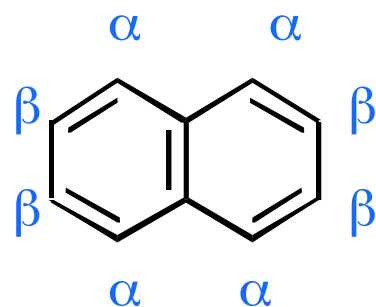


hexahelicene
 $C_{26}H_{16}$
m.p. $230^{\circ}C$

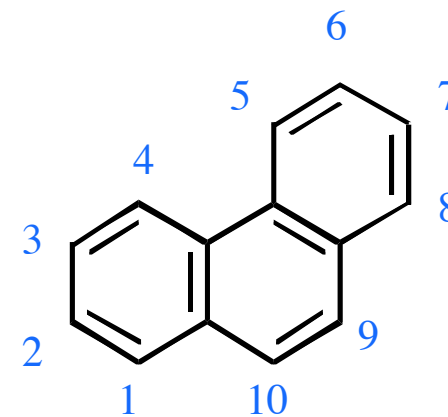
Naftaleno monoordezkatuak bi posizio ezberdin ditu: α (1,4,5,8) eta β (2,3,6,7).
 Hona hemen hidrokarburo aromatiko polizikliko nagusiak:



Naftalenoa

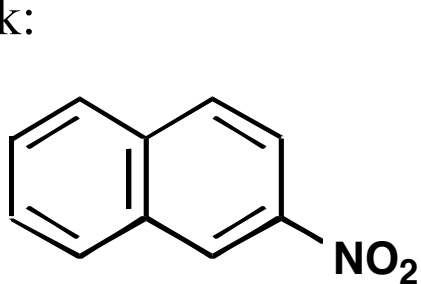


Antrazenoa

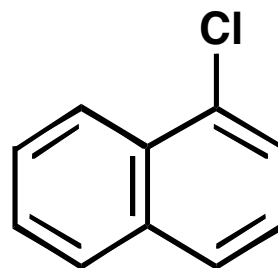


Fenantrenoa

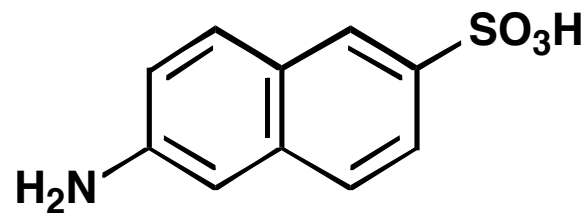
Adibideak:



2-Nitronaftalenoa
(β -nitronaftalenoa)



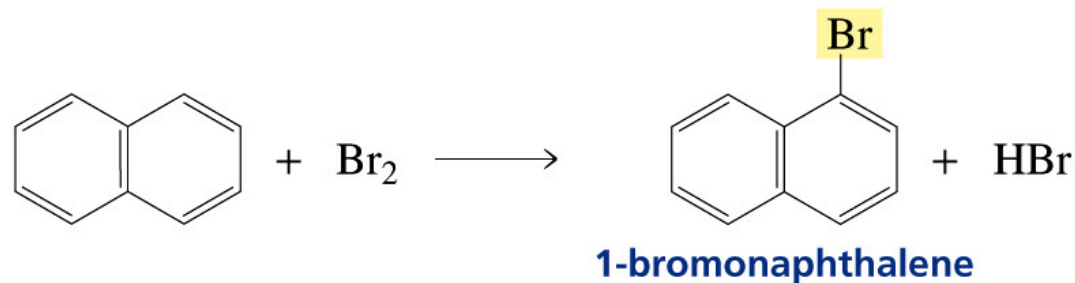
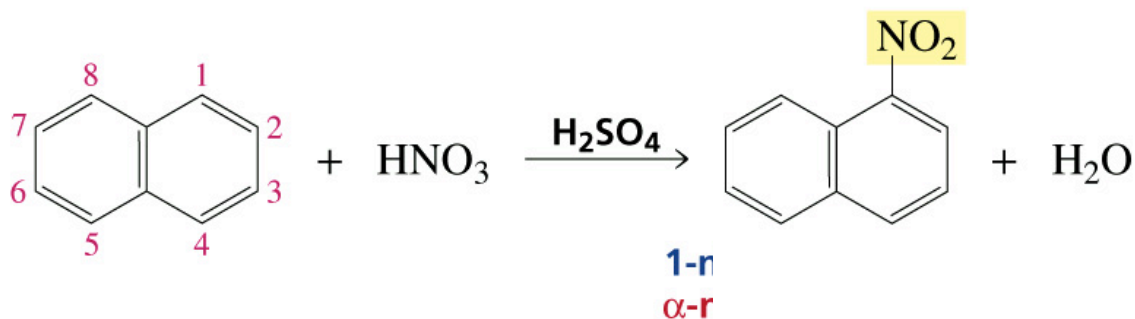
1-Kloronaftalenoa
(α -Kloronaftalenoa)



Azido 6-amino-2-naftaleno-
sulfonikoa

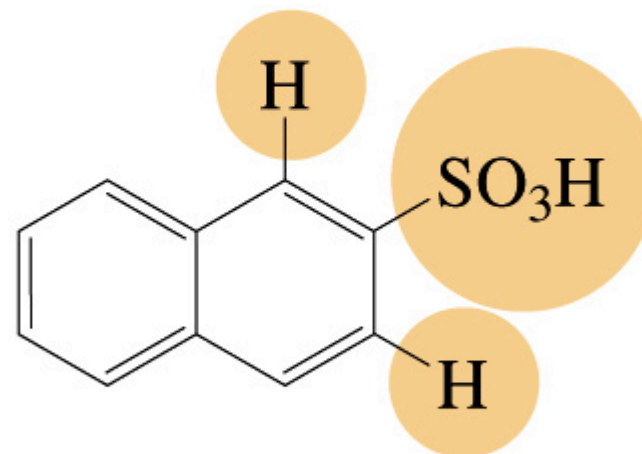
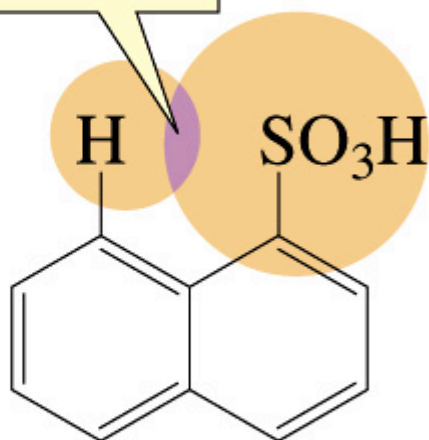
Naftalenoren eta naftaleno ordezkatuaren ordezkapen elektrozale aromatikoak

- Bentzenoa baino aktiboagoa da. Katalizatzailerik gabe ere erreakziona dezake



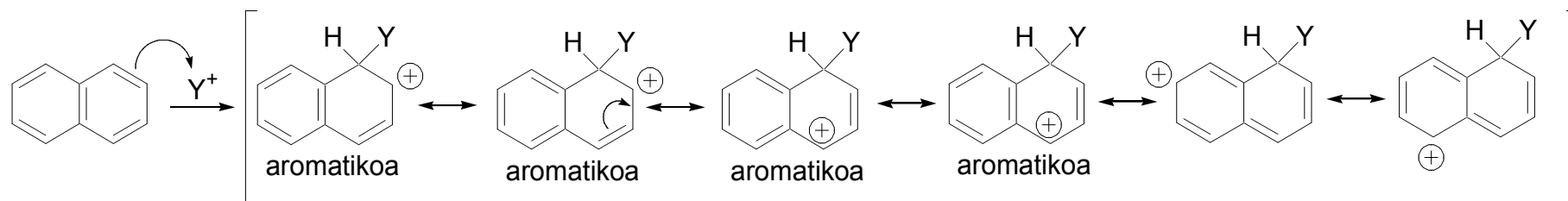
Naftaleno 1-ordezkatuak errezago sor daitezke
Naftaleno 2-ordezkatuak egonkorragoak dira

an unfavorable
steric interaction

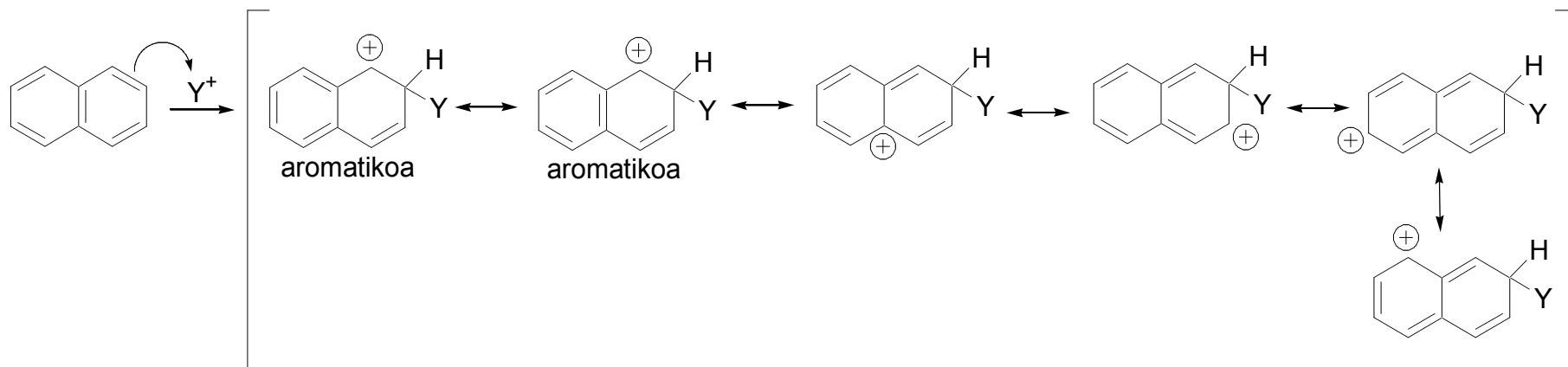


Zergaitik naftalenok arinago erreakzionatzen du α -tik

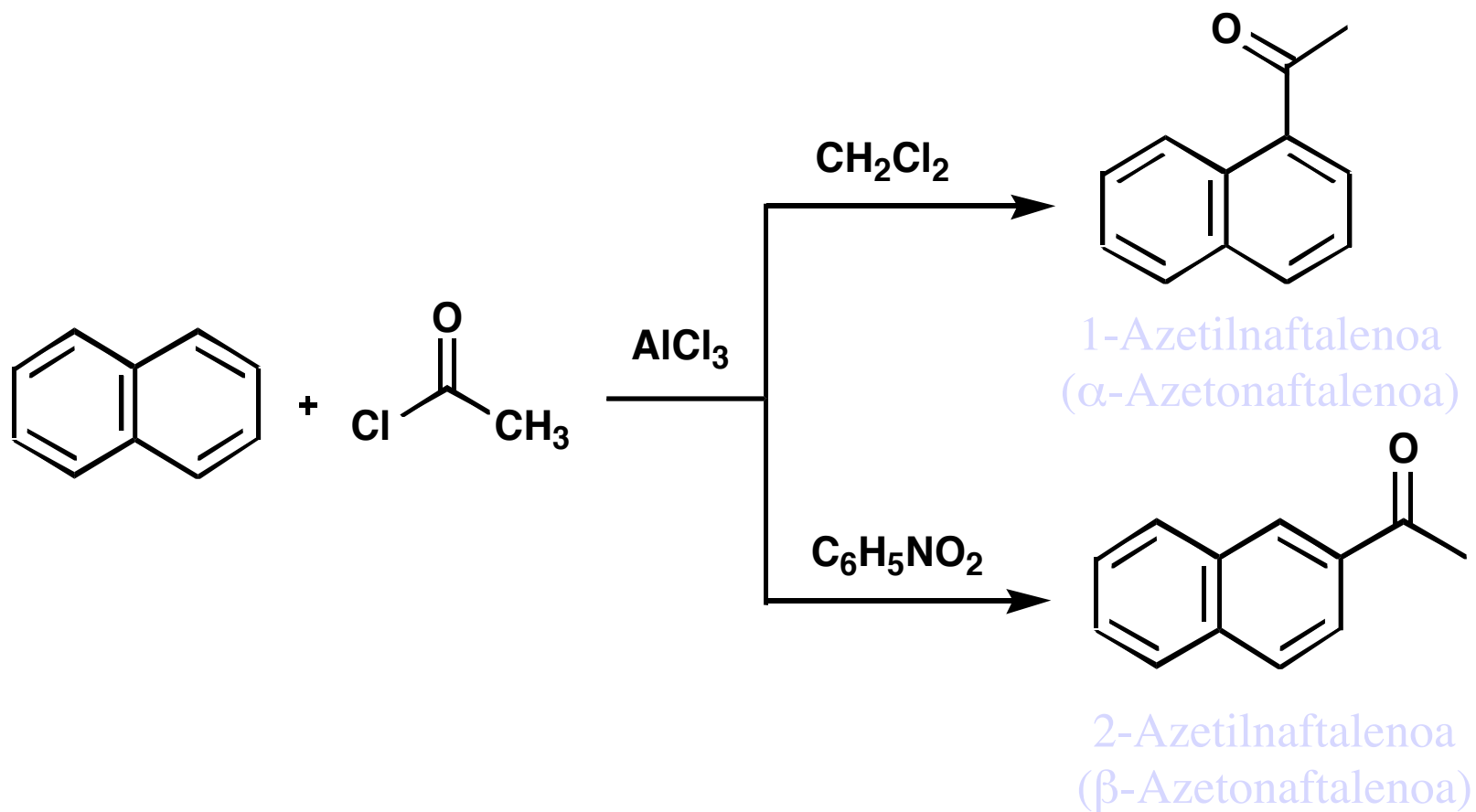
α -erasoa



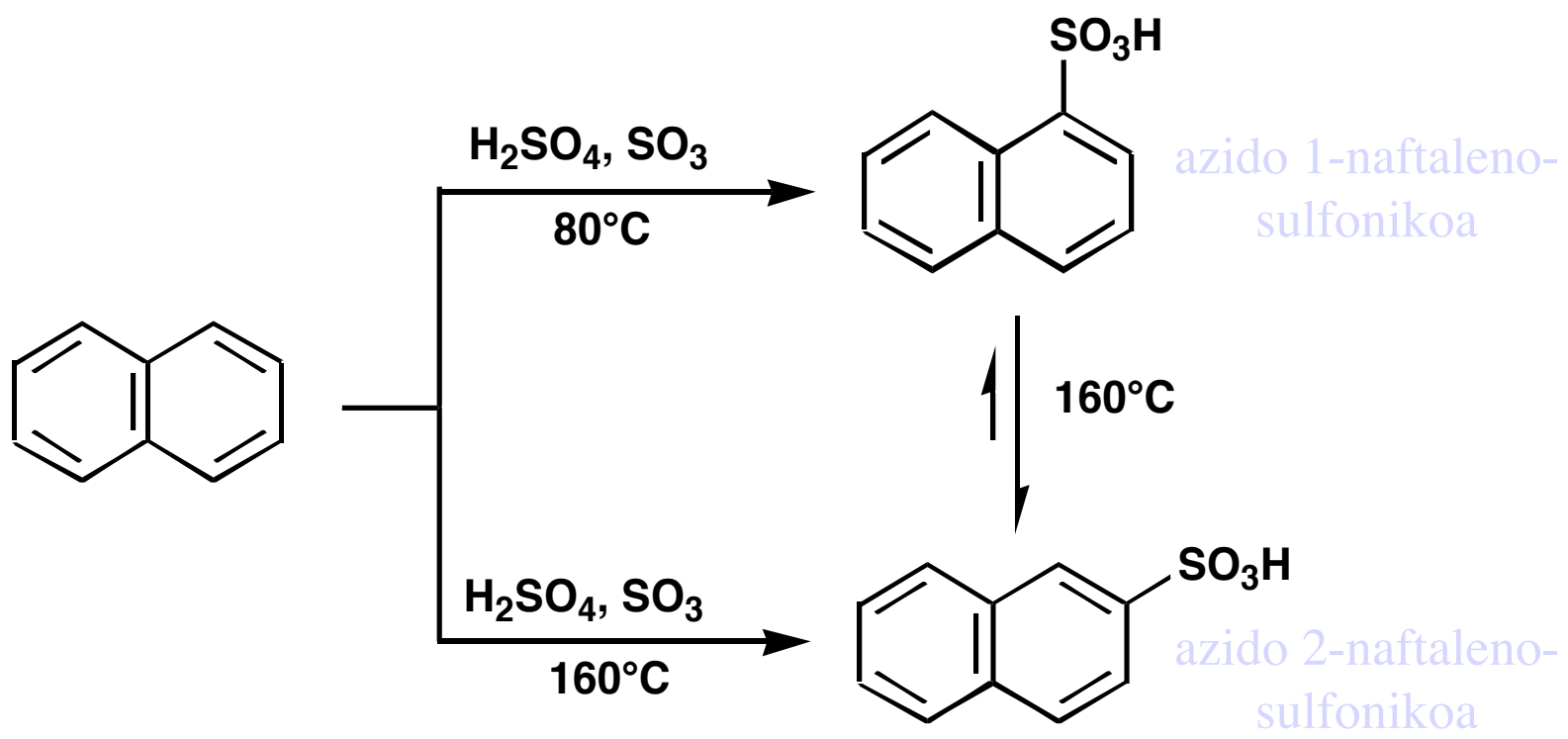
β -erasoa



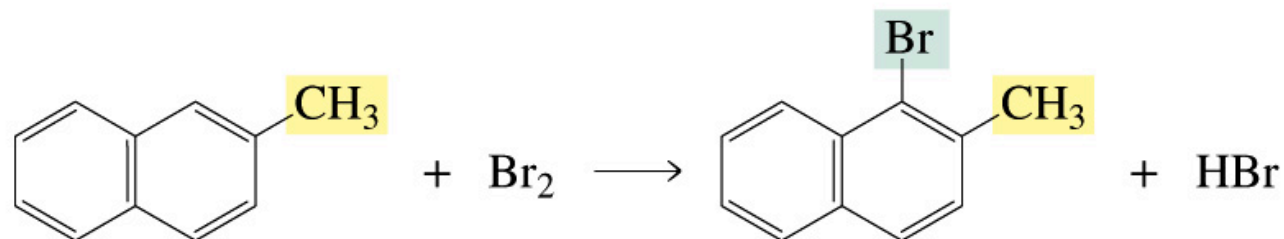
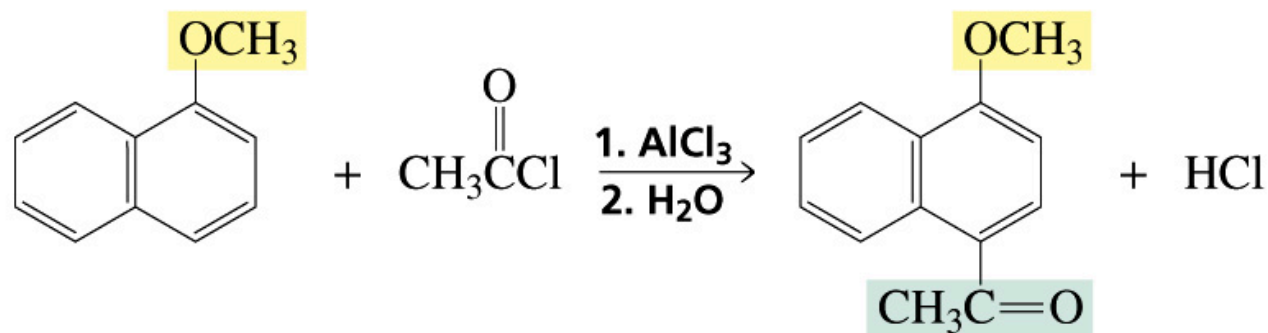
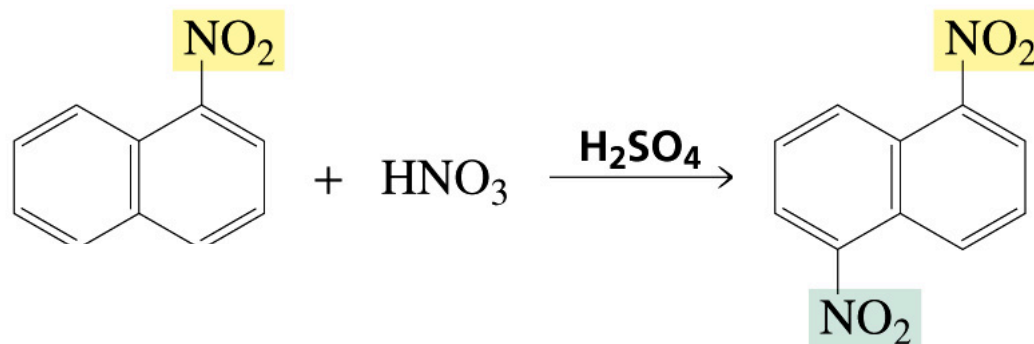
Naftalenoa bai 1- eta bai 2- posizioan azilatu daiteke polaritate ezberdineko disolbatzaileak erabiliz: disolbatzaile apolarrak 1-ordezkapena bultzatzen dute, eta polarrenak berriz, 2-ordezkapena.



Naftalenoren sulfonazioa *itzulgarria* denez, kontrol zinetikoa nahiz kontrol termodinamikoa erabil daiteke baldintzen arabera

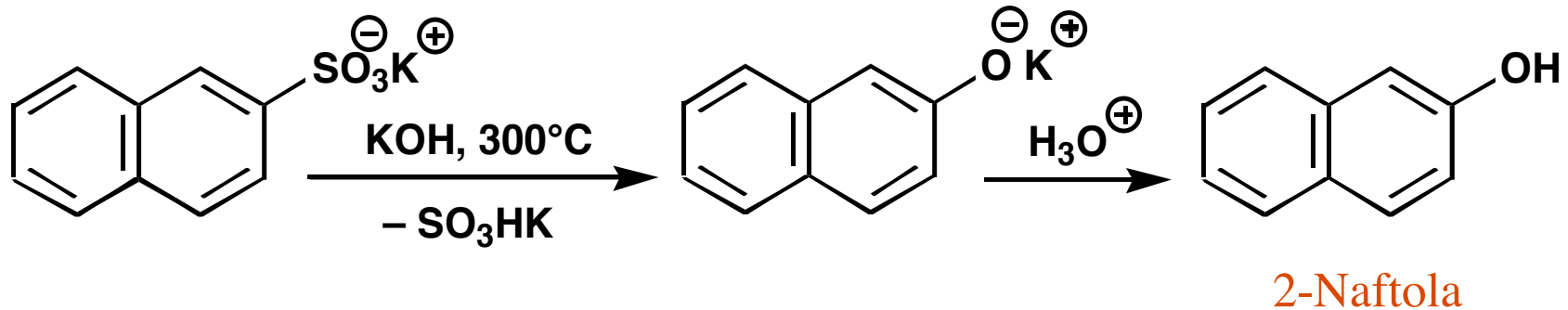


Naftaleno ordezkatuak: ordezkatzailearen izaerak aginduko du zein eraztunean emango den nagusiki ordezkapen elektrozalea

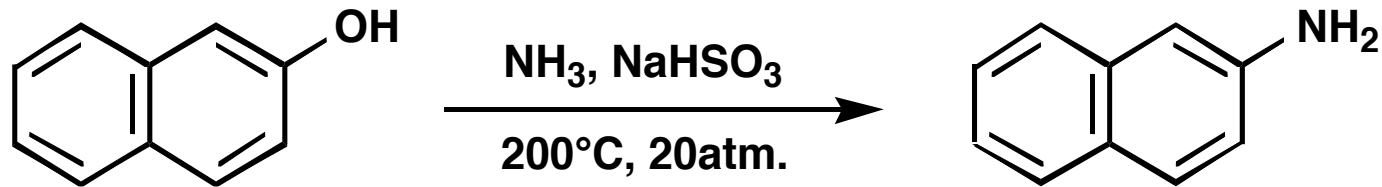


Naftaleno ordezkatuaren beste erreakzioak

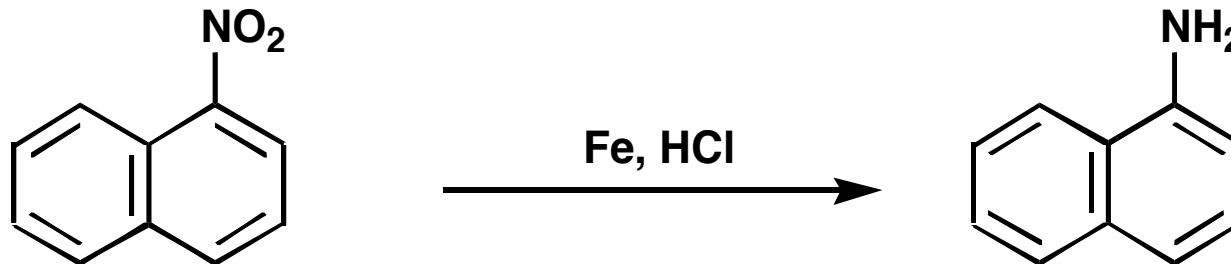
Gatza sulfonikoen fusioa potasarekin



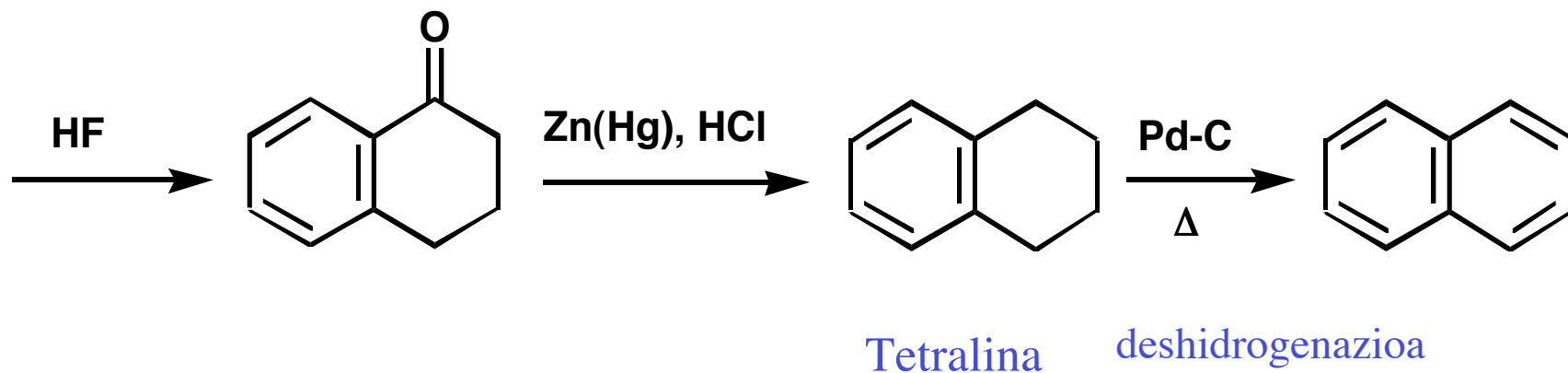
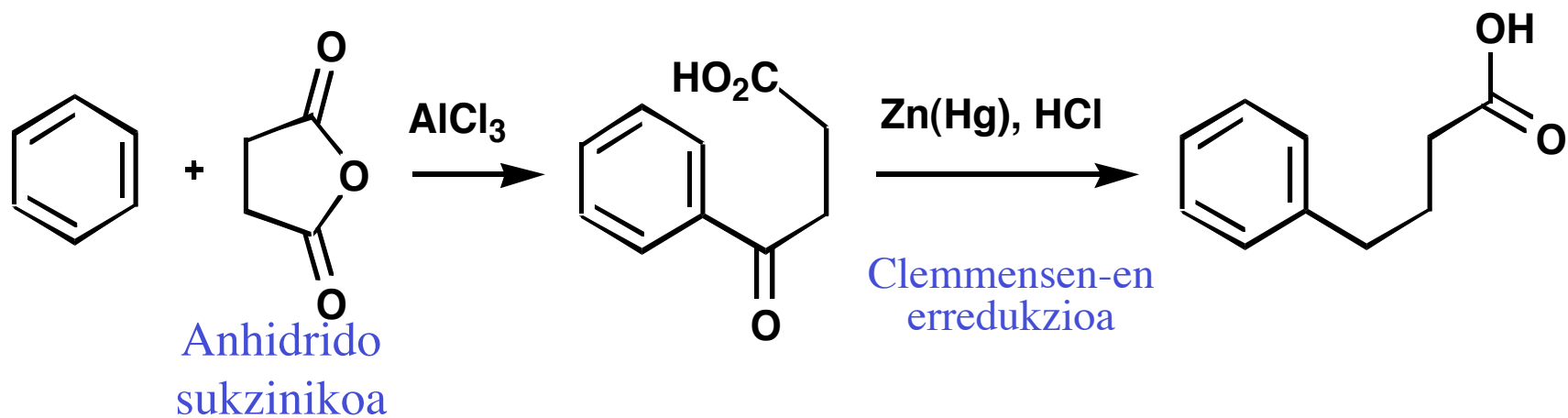
BUCHERER-en S_NAr erreakzioa



1-Naftilaminak lortzeko, nitroderibatuen erredukzioa da biderik egokiena.

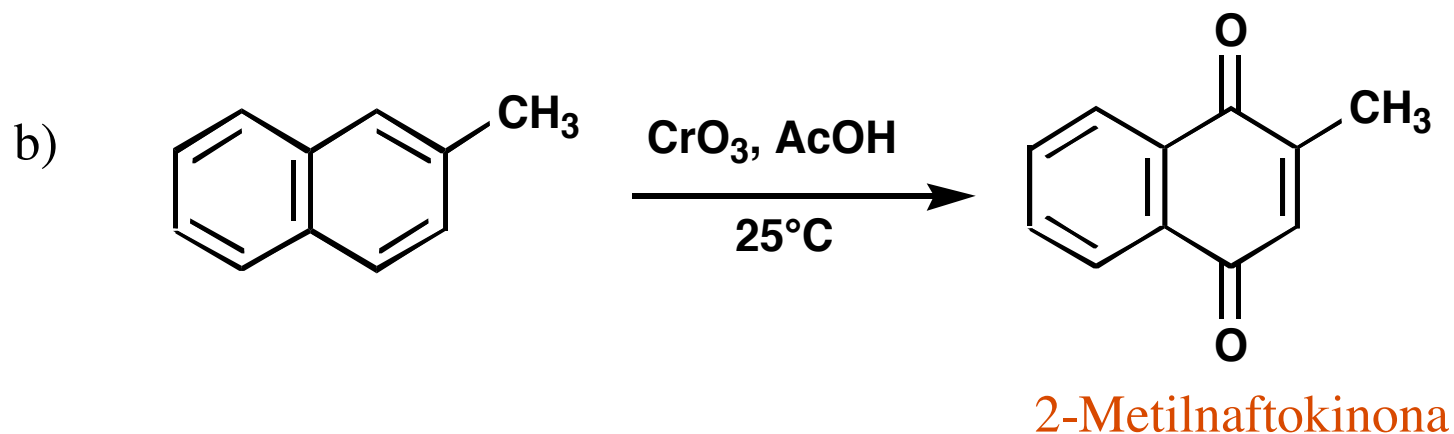
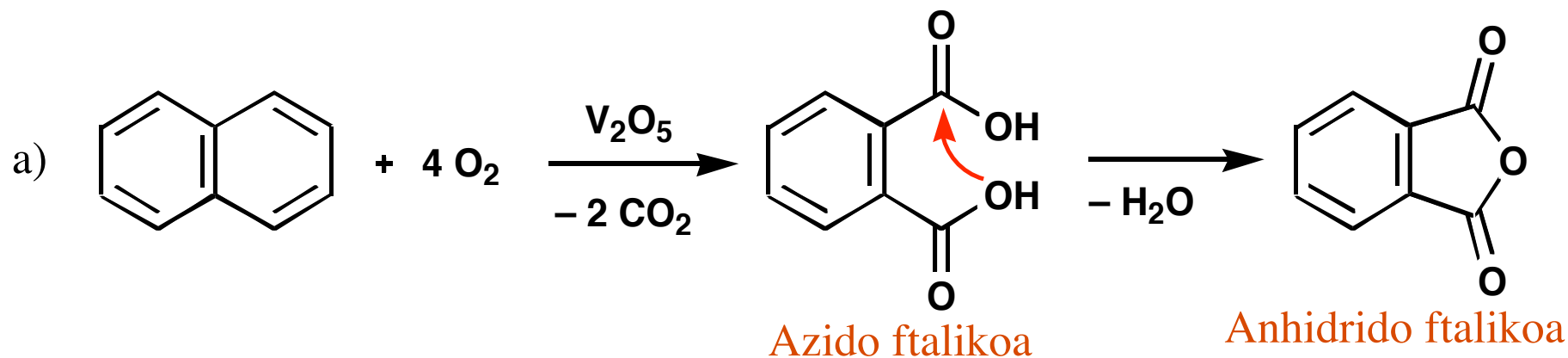


NAFTALENOAREN SINTESIA (HAW ORTH)



Naftalenoen oxidazioa

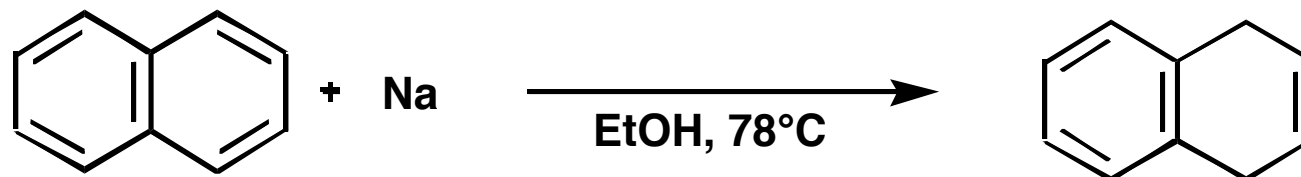
- a) Eraztun aromatikotako bat desegiten duena, bere ordean 2CO_2 talde emanez
b) Eraztuna desegin gabe, oxigeno-atomoak sartzen dituen *kinonak* emanez



Naftalenoen Erredukzioak

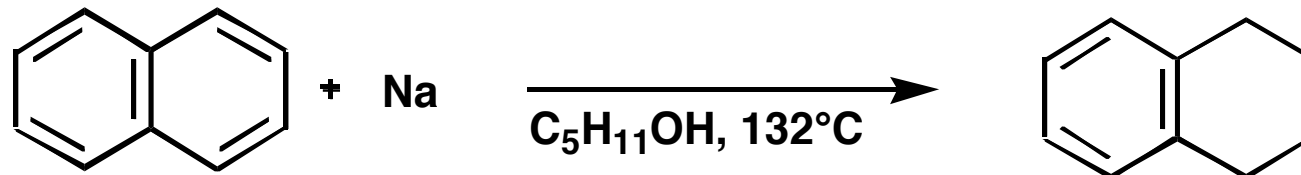
Naftalenoa bentzenoa baino errazago erreduzitzen da, 3 produktu desberdin emanaz

a) Metalen bidezko erredukzio arina:



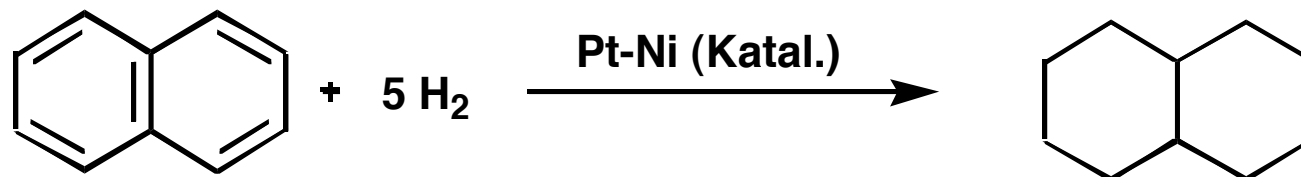
1,4-Dihidronaftalenoa

b) Metalen bidezko erredukzio bikoitza:



1,2,3,4-Tetrahidronaftalenoa
(tetralina)

c) Erabateko erredukzio katalitikoa:

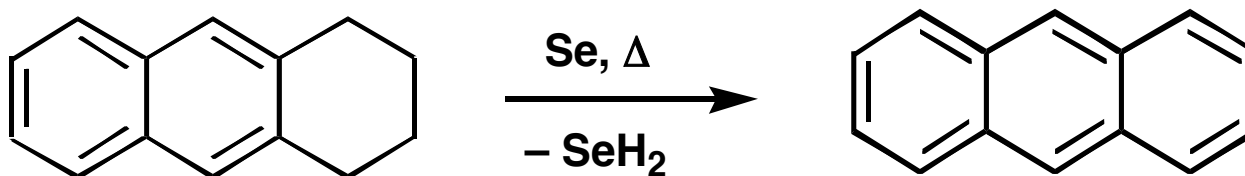
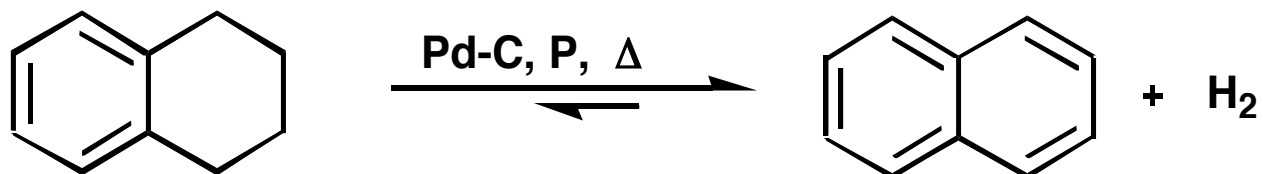


[4.4.0]-Biziklodekanoa
(Dekalina)

Albo-Kateen Erreakzioak

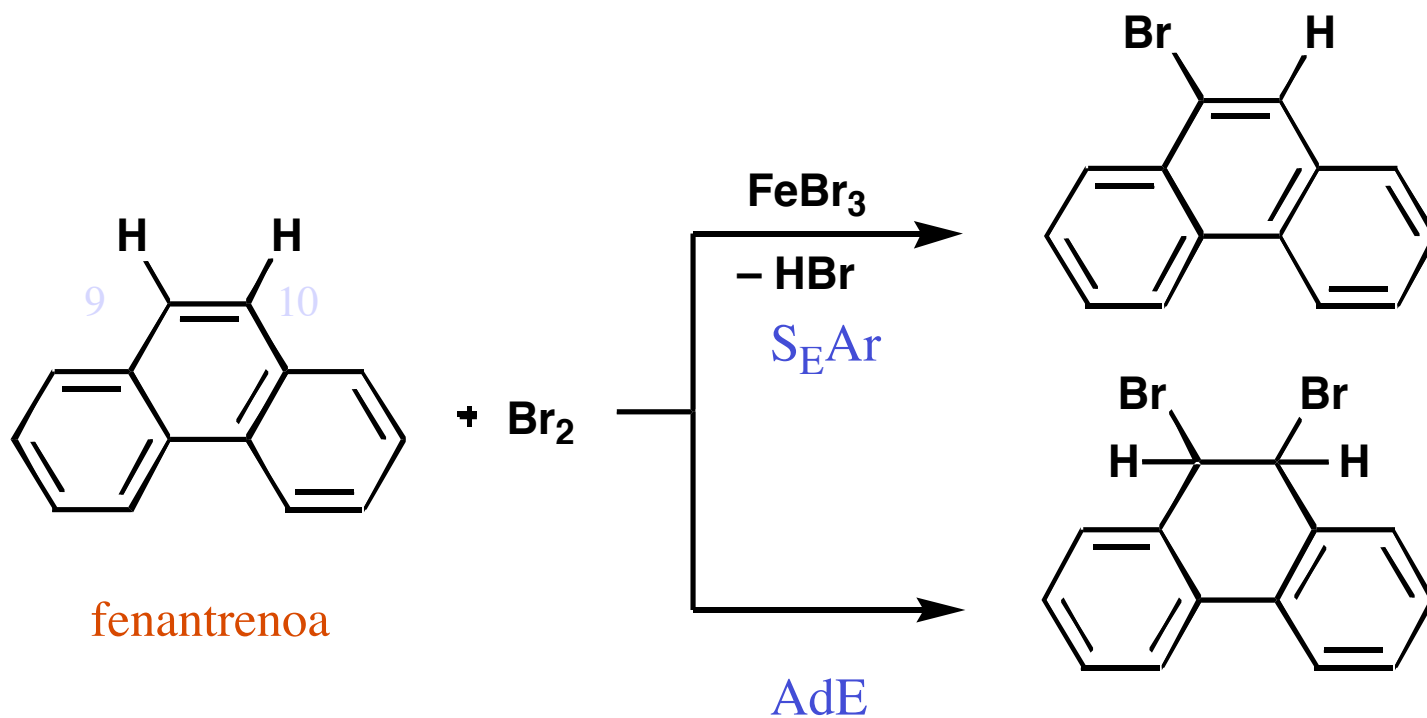
Adibidez, *aromatizazioa* (zikloetan), *halogenazioa*, *oxidazioa* eta *erredukzioa*.

1) Aromatizazioa



2) Halogenazioa

- Bai antrazenoan eta bai fenantrenoan 9 eta 10 posizioak dira errektiboak
- 2 erreakzio daude konpetentzian: AdE eta S_EAr



Bai antrazenoa eta bai fenantrenoa naftalenoa eta, batez ere, bentzenoa baino errazago oxidatu eta erreduzitzen dira (9 eta 10 posiziotan)

