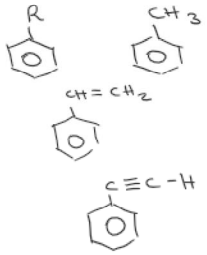
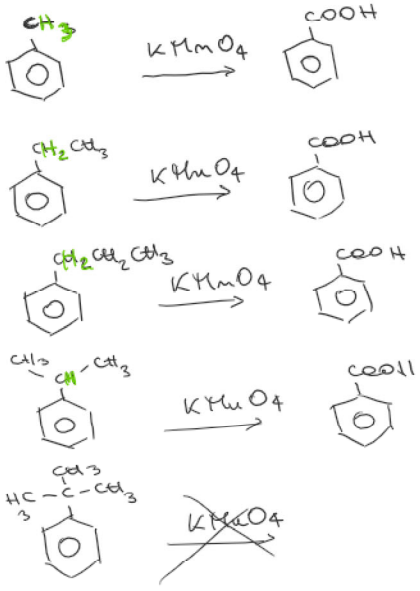
venerdì 4 aprile 2025 13:36

ARENI

- ALCHILBENZENI
- ALCHENILBENZENI
- ALCHINILBENZENI



OSSIDAZIONE DEGLI ALCHILBENZENI



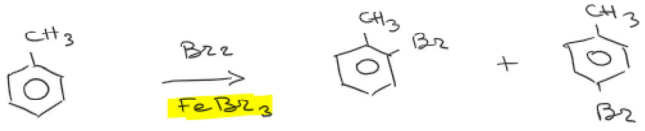
Acido Benzoico

L'ossidazione in ch. org. è una reazione che porta ad un maggior contenuto di ossigeno nel prodotto

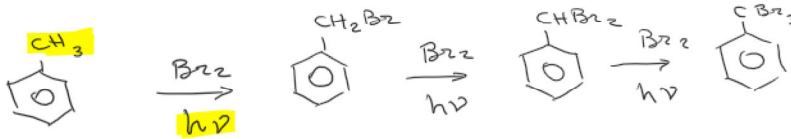
(oppure ad un minor contenuto di idrogeno)

Perché la reazione avvenga deve essere presente almeno 1 H benzilico

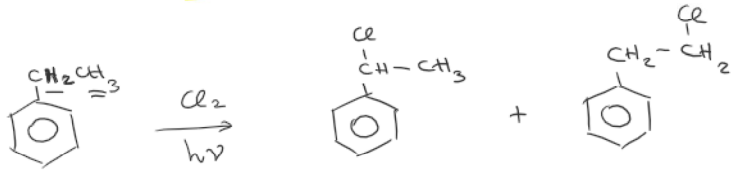
ALOGENAZIONE (radicalica) DEGLI ALCHILBENZENI



Sost. Elettr. Aром. Condizioni Ioniche



Cond. radicaliche

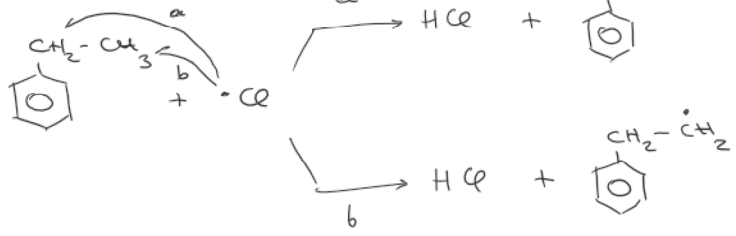


~ 90%

Iniziazione $Cl_2 \xrightarrow{h\nu} 2\,Cl\cdot$

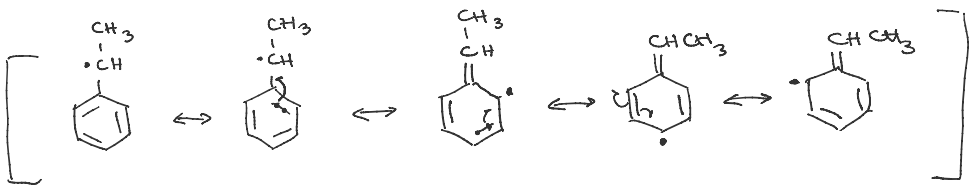
Propagazione

Addizione

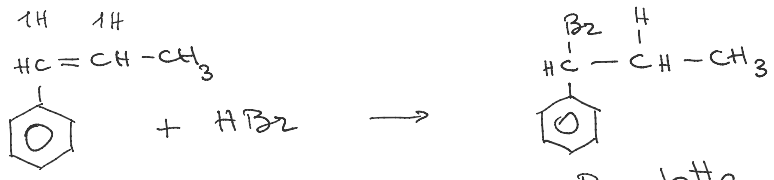


Sembra un radicale secondario ma è un radicale BENZILICO (più stabile)

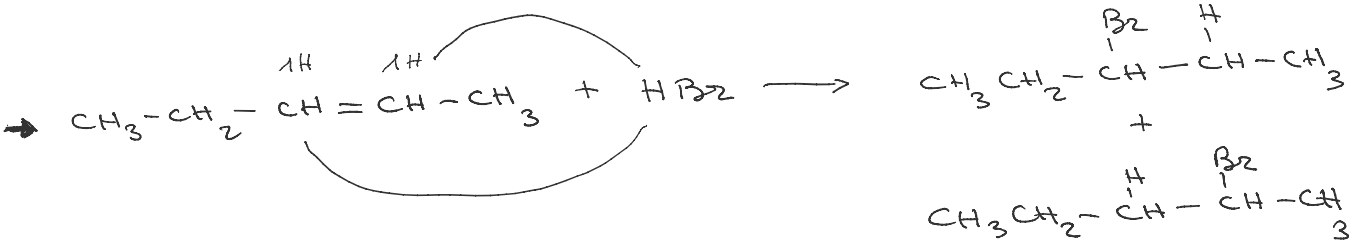
Radicale primario



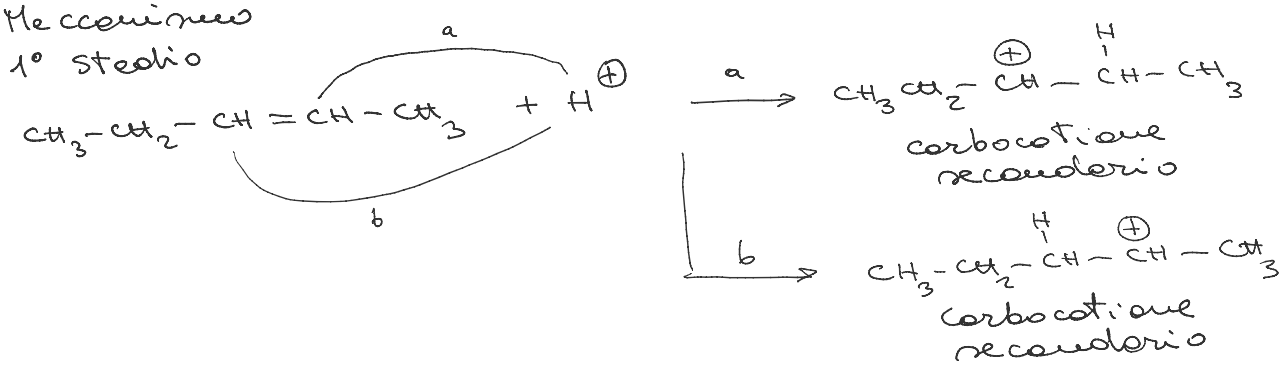
IDROALOGENAZIONE DEGLI ALCHENIL BENZENI (cond. ioniche)



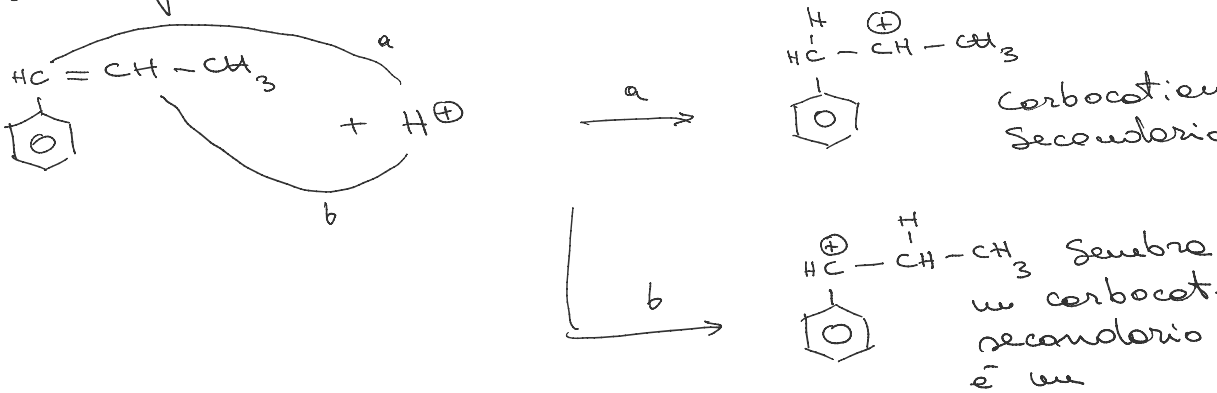
Prodotto Principale

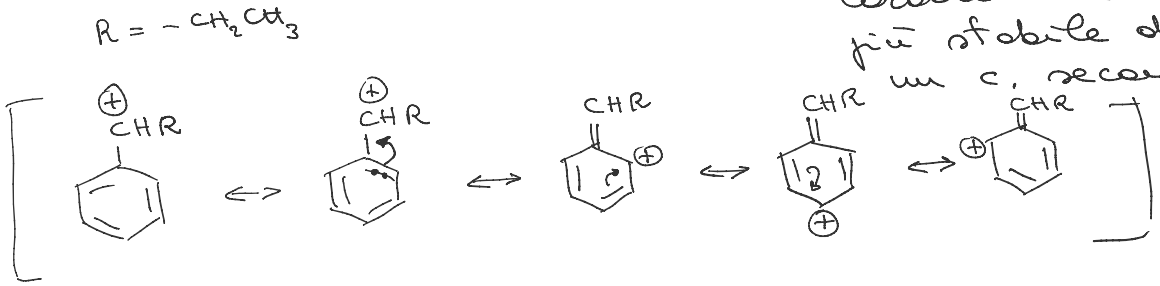


Meccanismo 1° stadio

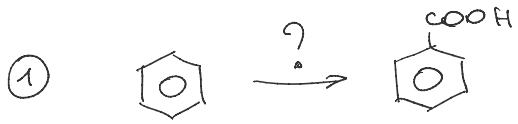


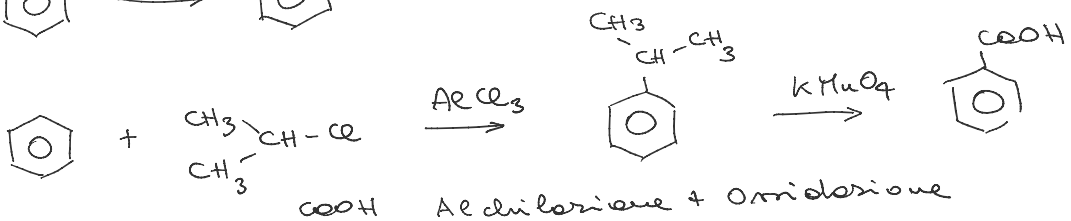
Per la prima reazione:



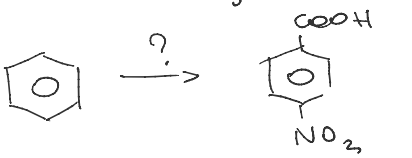


Esercizi

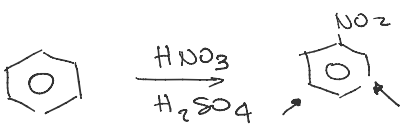
1) 



Alchilazione + ossidazione

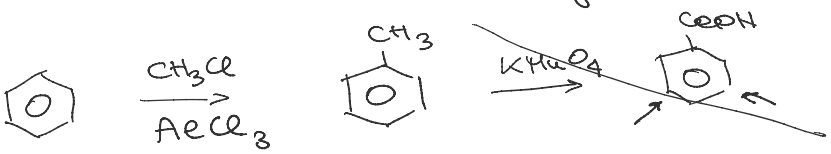
2) 

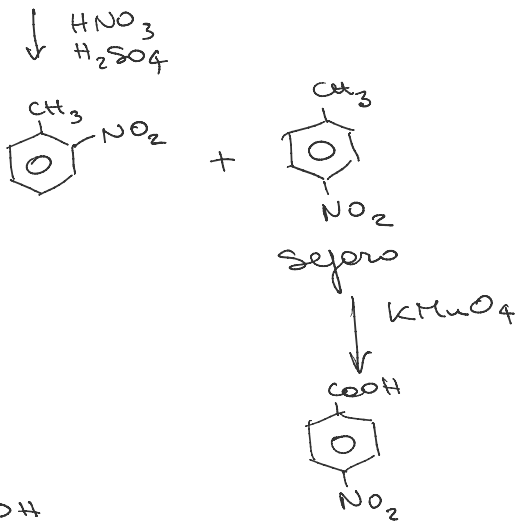
Nitrazione

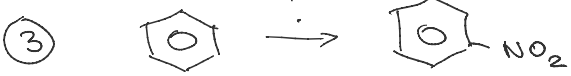


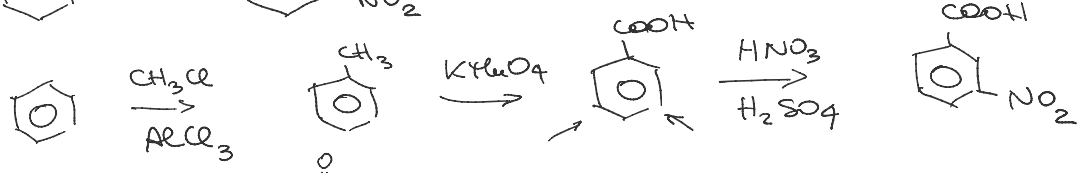
No perché meta-orientante

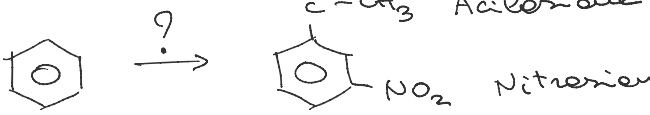
No perché l'alchilazione non avviene su anelli fortemente disattivati





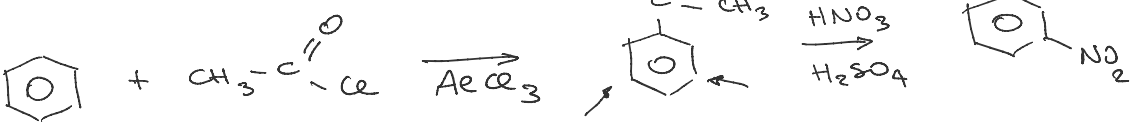
3) 



4) 

Acilazione

Nitrazione



REGOLA DI HÜCKEL

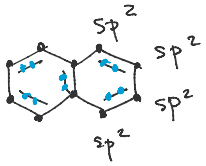
REGOLA DI HÜCKEL

Un composto può dirsi aromatico se:

1. è ciclico
2. è planare
3. possiede $4n+2$ elettroni π ($n = 0, 1, 2 \ldots$)

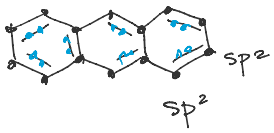
$n = 0$	2 e^- π
$n = 1$	6 e^- π
$n = 2$	10 e^- π
$n = 3$	14 e^- π ...

APPLICHIAMO LA REGOLA A SISTEMI BENZENOIDI



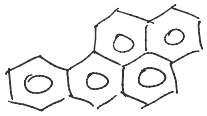
NAFTALENE (Naftalina) AROMATICO

✓ ciclico
✓ planare
✓ 10 e^- π



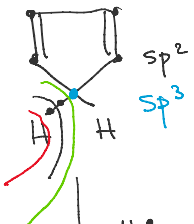
ANTRACENE AROMATICO

✓ ciclico
✓ planare
✓ 14 e^- π



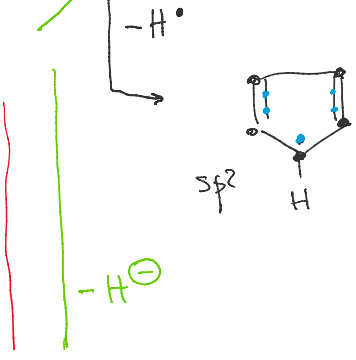
BENZOPIRENE

SISTEMI NON BENZENOIDI



1,3-CICLOPENTADIENE NON AROMATICO

✓ ciclico
✗ planare



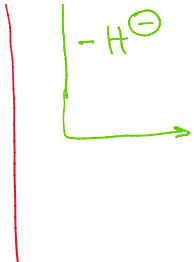
Radicale ciclopentadienilico NON AROMATICO

✓ ciclico
✓ planare
✗ 5 e^- π

(per Hückel i radicali del C i carbocationi e i carbanioni non planari sp^2)

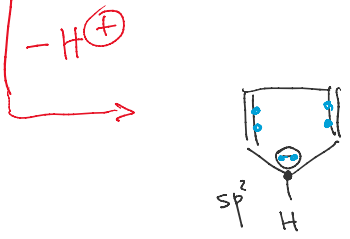
... ciclopentadienilico

sp^2)



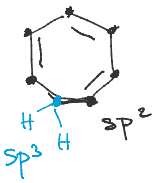
carbocatione ciclopentadienilico
NON AROMATICO

✓ ciclico
✓ planare
✗ 4 e^- π



Anione ciclopentadienilico
AROMATICO

✓ ciclico
✓ planare
✓ 6 e^- π

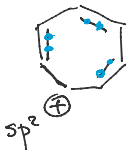


1,3,5-cicloeptatriene
✓ ciclico
✗ planare
NON AROM.

ciclopentadiene
AROMATICO

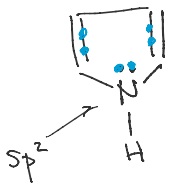
$K_e = 10^{-16}$

solitamente gli
el. con $K_e = 10^{-50}$



catione cicloeptatrienilico
✓ ciclico
✓ planare
✓ 6 e^- π
AROMATICO!

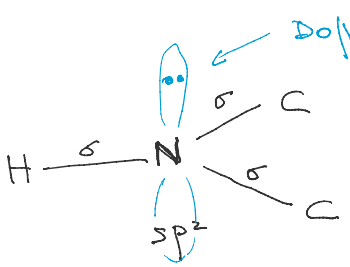
ETEROCICLI cicli contenenti eteroatomi (atomi ≠ dal C come N, O, S)

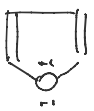


PIRROLO

✓ ciclico
✓ planare
✓ 6 e^- π

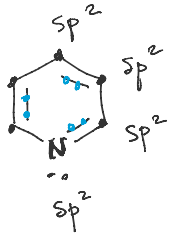
AROMATICO
energ. coniug. 21 Kcal/mole





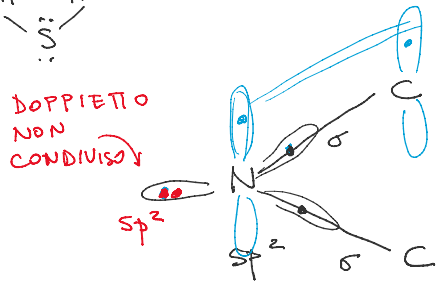
FURANO

TIOFENE



PIRIDINA

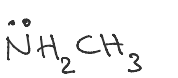
✓ ciclico
✓ planare
✓ 6 e^- π

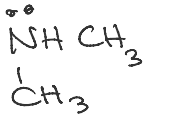


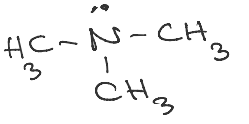
AROMATICO

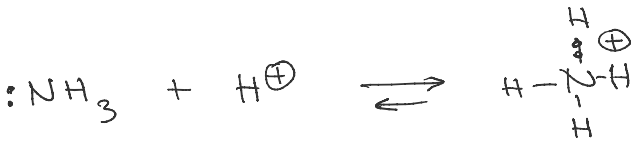
BASICITÁ DELLE AMMINE


$pK_b = 4,7$

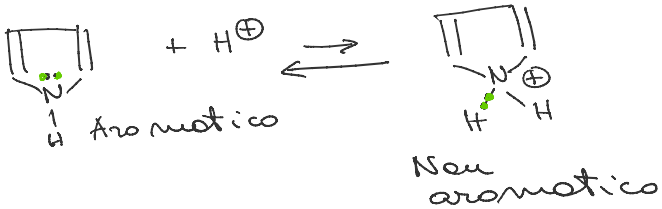

$pK_b = 3,3$ Ammine primarie più basica dell'ammoniaca


$pK_b = 3,2$ Ammine secondarie ancora più basica

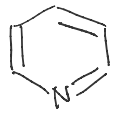

$pK_b = 4,3$ Ammine terziarie Meno basica rispetto all'ammine primarie e secondarie (ingombro sterico)


ione ammonio


$pK_b = 14$


Aromatico

Non aromatico


$pK_b = 9$


orbitale che mantiene il doppietto vicino al nucleo diversamente da $:NH_3$ in cui il doppietto non condivisa è in un orbitale sp^3