

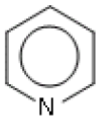
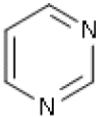
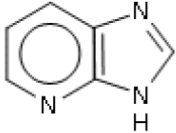
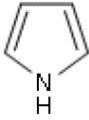


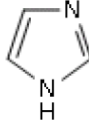
# Aromaticità e benzene

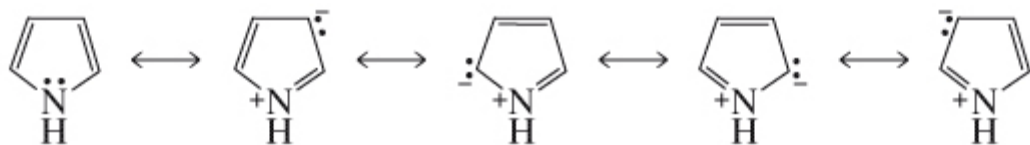
# Risonanza del naftalene



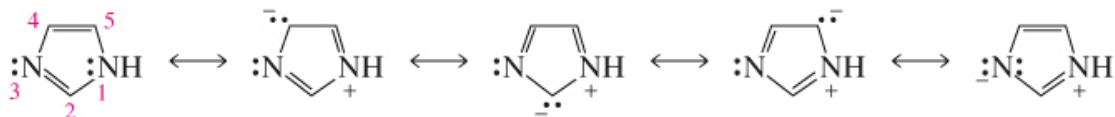
## Assegnare il nome ai seguenti composti eterociclici aromatici

Gli areni si definiscono **eterociclici** quando uno o più atomi di carbonio di un anello aromatico sono sostituiti da altri elementi chimici (**eteroatomi**) senza che venga persa l'aromaticità, i più importanti eterociclici aromatici, da un punto di vista biochimico sono:

						
Piridina	Pirimidina	Purina	Pirrolo	Tiofene	Furano	Imidazolo



**strutture limite di risonanza del pirrolo**

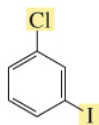


strutture limite di risonanza dell'imidazolo

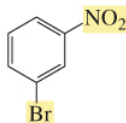


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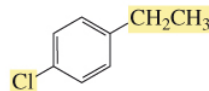
# nomenclatura



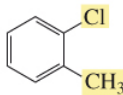
**1-cloro-3-iodobenzene**  
*meta*-cloroiodobenzene  
non  
1-iodo-3-clorobenzene o  
*meta*-iodoclorobenzene



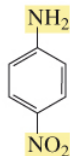
**1-bromo-3-nitrobenzene**  
*meta*-bromonitrobenzene



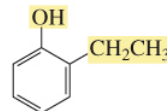
**1-cloro-4-etilbenzene**  
*para*-cloroetilbenzene



**2-clorotoluene**  
*orto*-clorotoluene  
non  
*orto*-clorometilbenzene

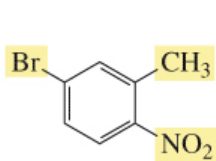


**4-nitroanilina**  
*para*-nitroanilina  
non  
*para*-amminonitrobenzene

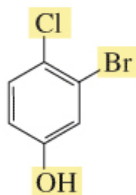


**2-etilfenolo**  
*orto*-etilfenolo  
non  
*orto*-etilidrossibenzene

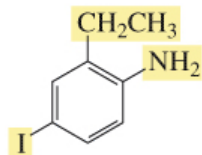
## nomenclatura



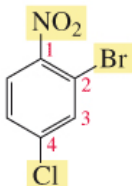
5-bromo-2-nitrotoluene



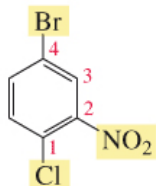
3-bromo-4-clorofenolo



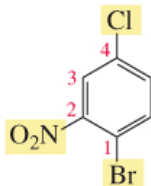
2-etil-4-iodoanilina



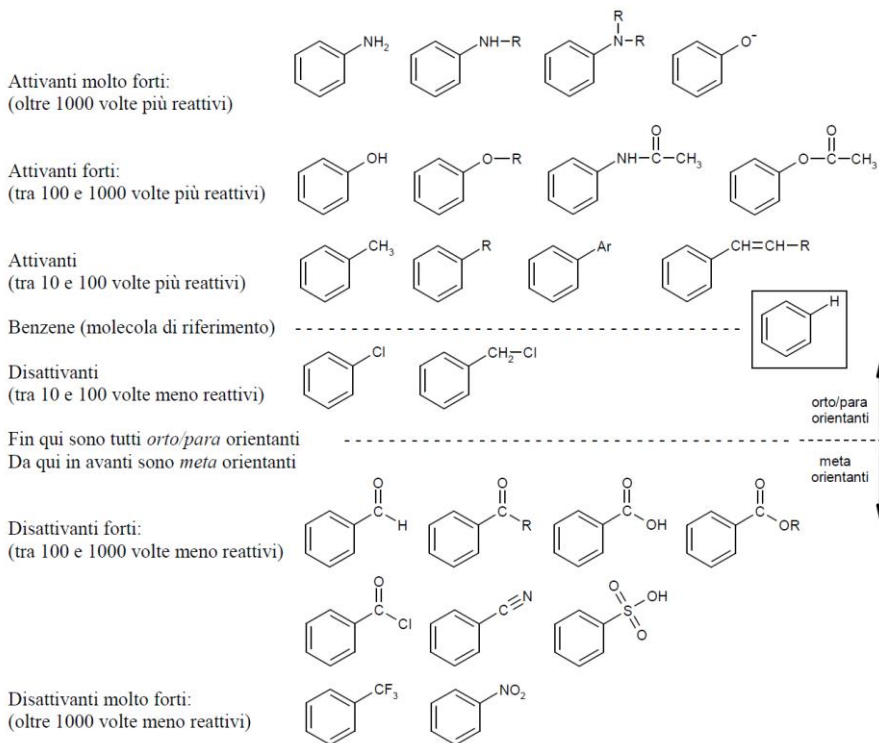
2-bromo-4-cloro-1-nitrobenzene



4-bromo-1-cloro-2-nitrobenzene

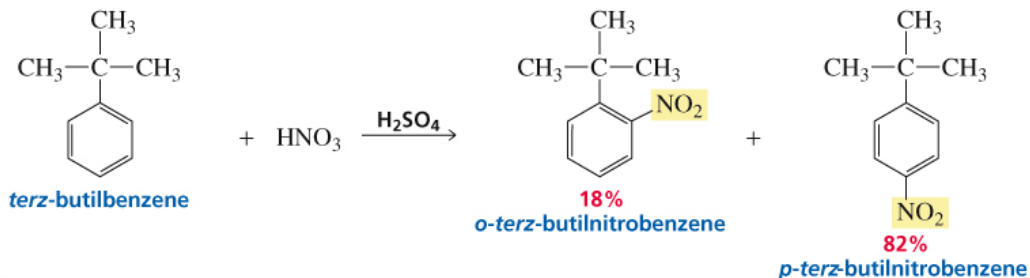
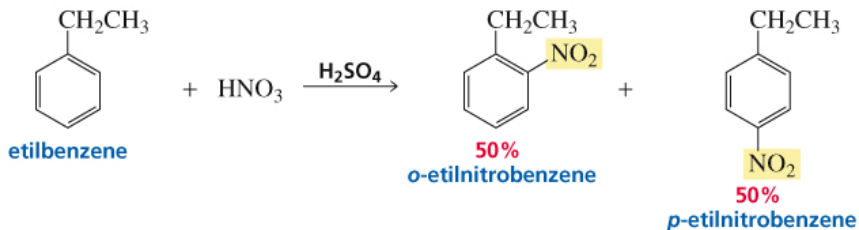
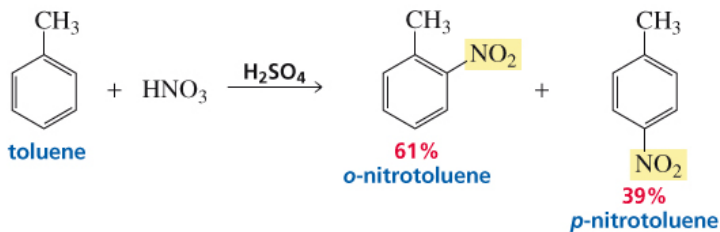


1-bromo-4-chloro-2-nitrobenzene



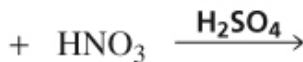
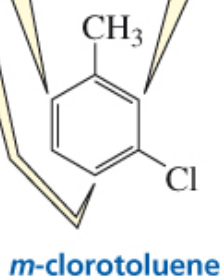


## Prodotti delle reazioni di sostituzione elettrofila aromatica

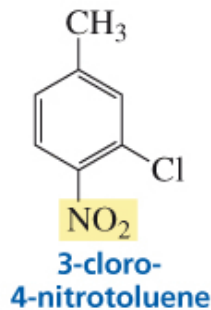


## Prodotti delle reazioni di sostituzione elettrofila aromatica

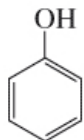
entrambi i sostituenti metile e cloro orientano il gruppo entrante nelle posizioni indicate



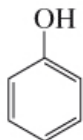
+



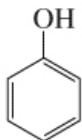
## Scala di acidità



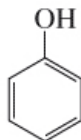
$pK_a = 10.20$



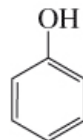
$pK_a = 10.19$



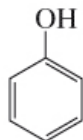
$pK_a = 9.95$   
fenolo



$pK_a = 9.38$



$pK_a = 7.66$

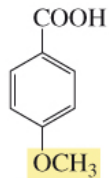


$pK_a = 7.14$

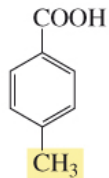


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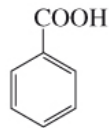
## Scala di acidità



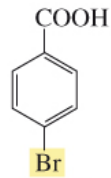
$pK_a = 4.47$



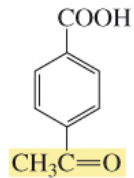
$pK_a = 4.34$



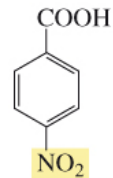
$pK_a = 4.20$



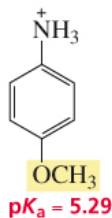
$pK_a = 4.00$



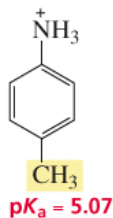
$pK_a = 3.70$



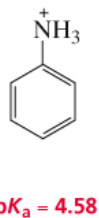
$pK_a = 3.44$



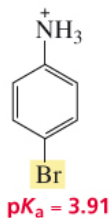
$pK_a = 5.29$



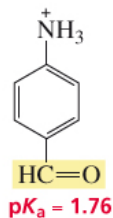
$pK_a = 5.07$



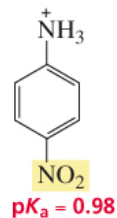
$pK_a = 4.58$



$pK_a = 3.91$



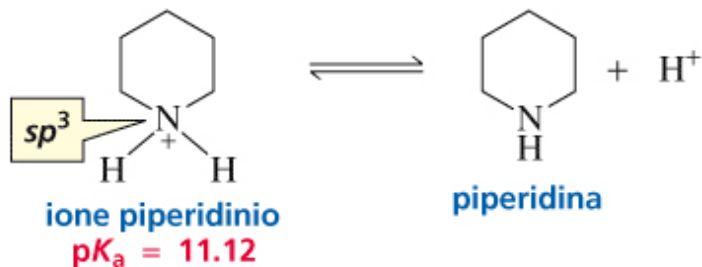
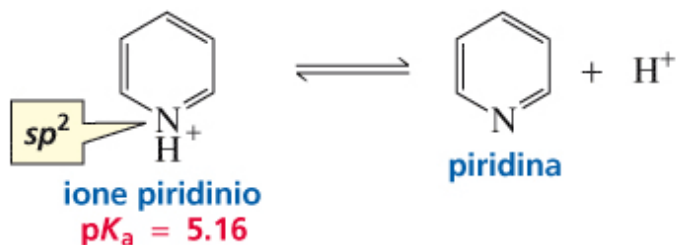
$pK_a = 1.76$



$pK_a = 0.98$

ammine

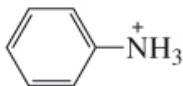
## Confronto della basicità delle ammine



Sistemare in una scala di basicità crescente le seguenti specie chimiche:  
Propanammina, anilina, ione amiduro,



ione ammonio  
 $\text{p}K_a = 10.8$



ione anilinio  
 $\text{p}K_a = 4.58$

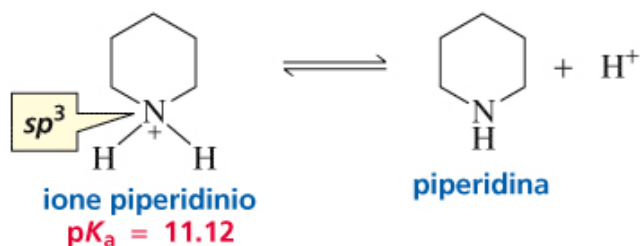
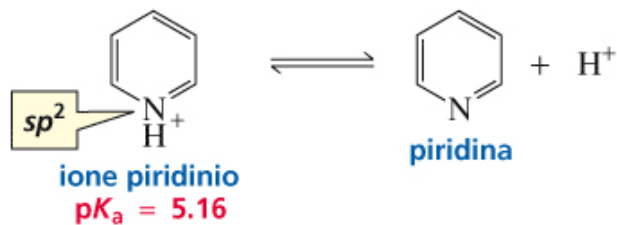


ammina  
 $\text{p}K_a = 40$



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Sistemare in una scala di basicità crescente le seguenti specie chimiche:  
Piridina, piperidina





Scrivere la struttura di un'ammina primaria, una secondaria e una terziaria assegnando il nome IUPAC.

Scegliere una delle ammine e descrivere il meccanismo di:

- Una reazione in cui l'ammina funge base
- Una reazione in cui l'ammina funge da nucleofilo

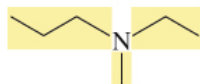


un'ammina primaria  
1-pentanamina  
pentilammina

nome sistematico:  
nome d'uso:



un'ammina secondaria  
N-etil-1-butanamina  
butiletilammina



un'ammina terziaria  
N-etil-N-metil-1-propanamina  
etilmetil-1-propilammina

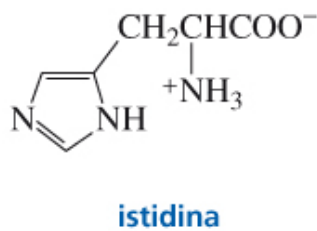
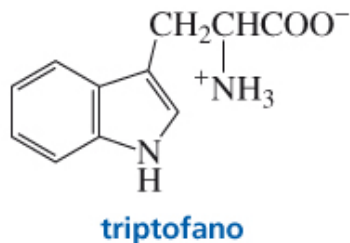
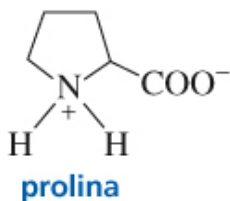
un'ammina è una base



un'ammina è un nucleofilo



Scrivere la struttura prevalente di ciascuna delle molecole sotto riportate in soluzione acquosa a pH 7,4 e a pH 2.



## Sintesi dell'anilina

