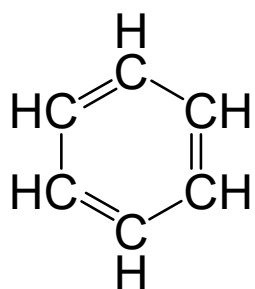


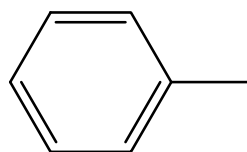
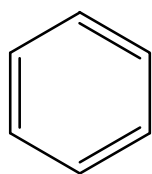
Idrocarburi aromatici

Idrocarburi ciclici contenenti doppi legami alternati a legami singoli e dotati di particolare stabilità per cui non danno reazioni di addizione, pur essendo insaturi.

Tutti i carboni sono ibridati sp^2



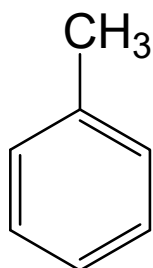
benzene



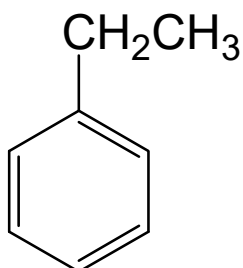
fenile

Alchil-benzeni = Areni

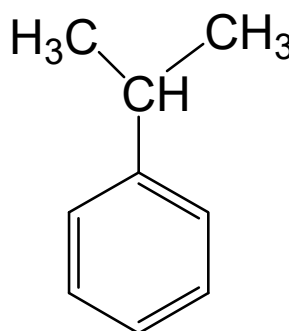
il residuo è indicato con **Ar**



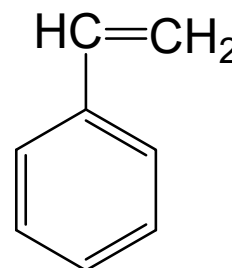
metil-benzene
toluene



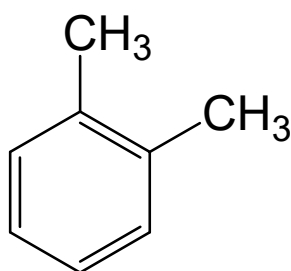
etil-benzene



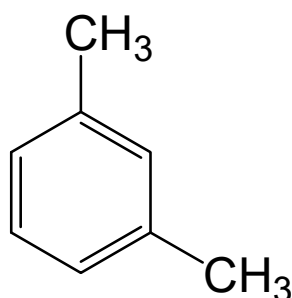
isopropil-benzene



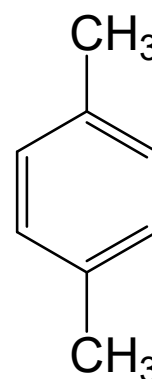
stirene



orto-dimetil-benzene



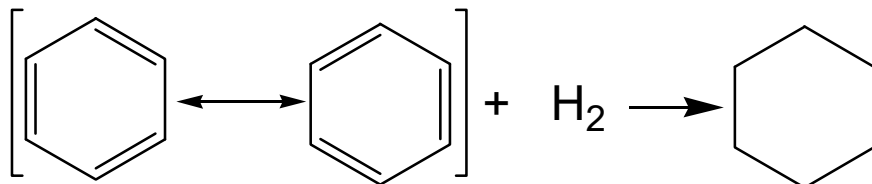
meta-dimetil-benzene



para-dimetil-benzene

Energia di risonanza del benzene

L'energia di risonanza è la differenza tra l'energia dell'ibrido di risonanza (la realtà fisica) e la più stabile delle strutture canoniche di risonanza (strutture ipotetiche) che ad esso contribuiscono

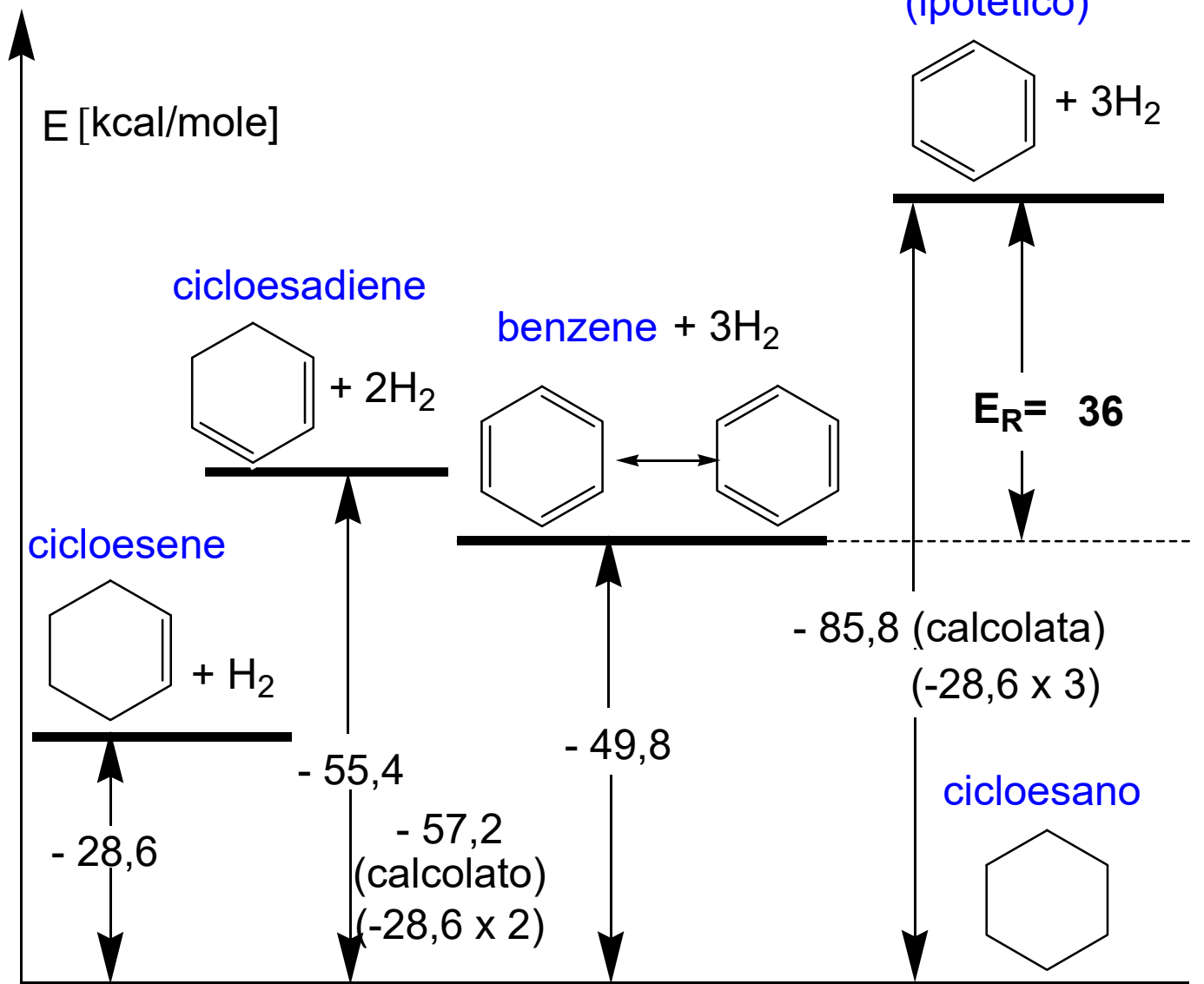


benzene

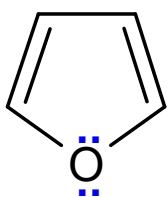
cicloesano

$$\Delta H^\circ = -49,8 \text{ kcal/mole}$$

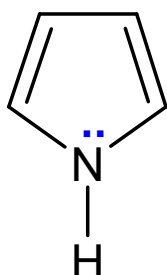
cicloesatriene
(ipotetico)



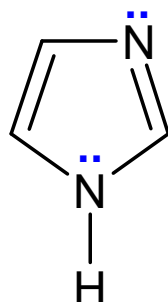
Composti eterociclici aromatici = Composti aromatici che contengono tra gli atomi del ciclo anche elementi diversi dal carbonio



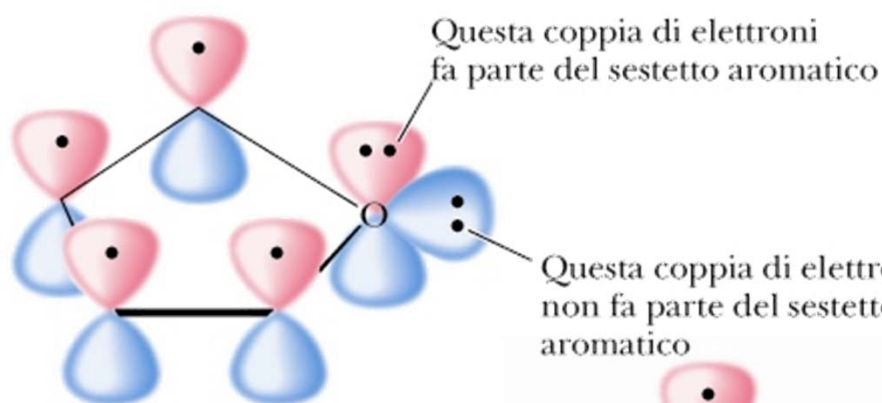
Furano



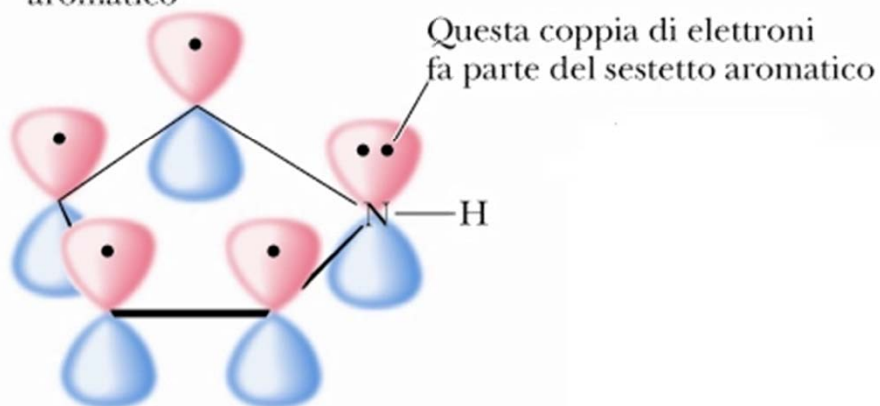
Pirrolo



Imidazolo

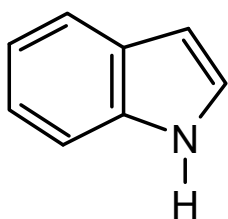


Furano

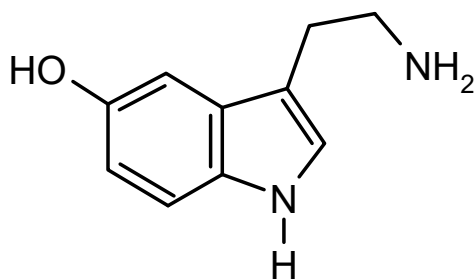


Pirrolo

Esempi di eterociclici aromatici presenti in natura



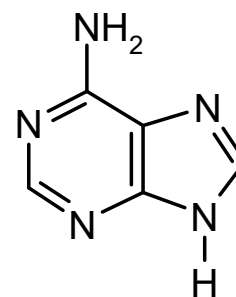
Indolo



Serotonina



Purina



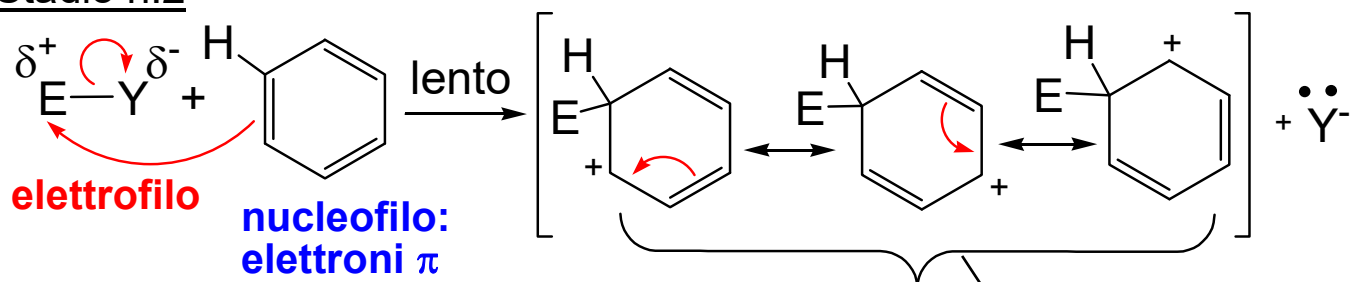
Adenina

Reattività dei composti aromatici. Sostituzione elettrofila aromatica

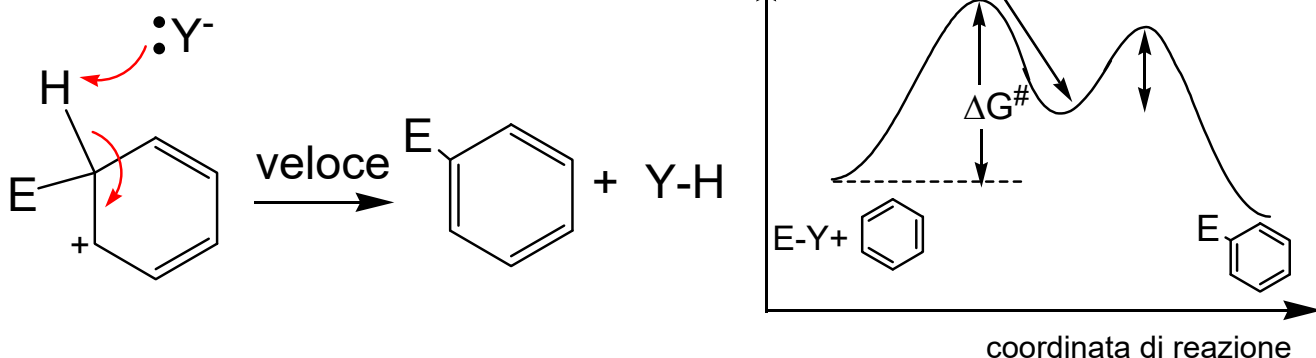
Gli idrocarburi aromatici, pur essendo altamente insaturi, non danno reazioni di addizione elettrofila ma solo di sostituzione elettrofila, perchè i loro legami π sono molto stabili e difficilmente possono essere rotti.

Stadio n.1: generazione dell'elettrofilo (E-Y)

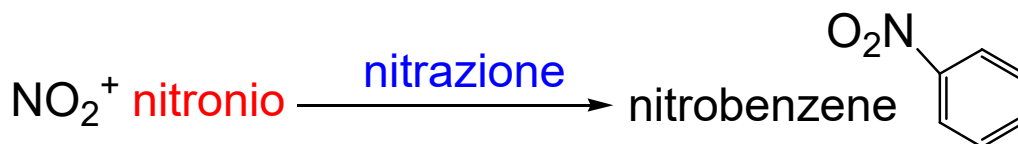
Stadio n.2



Stadio n.3



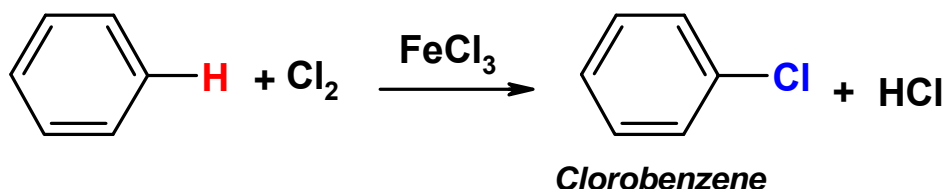
Elettrofili più comuni



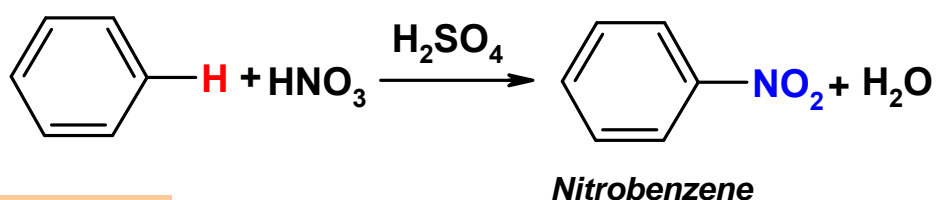
Reattività dei composti aromatici.

Sostituzione elettrofila aromatica

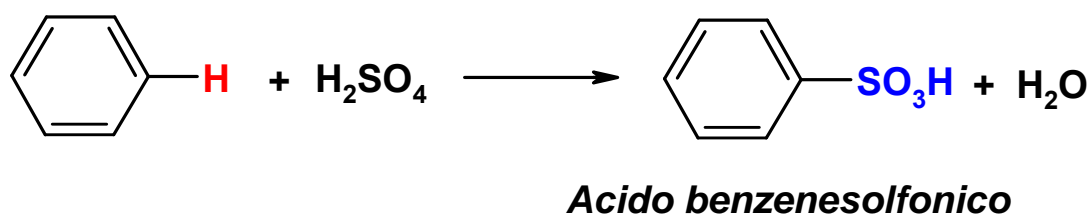
Alogenazione



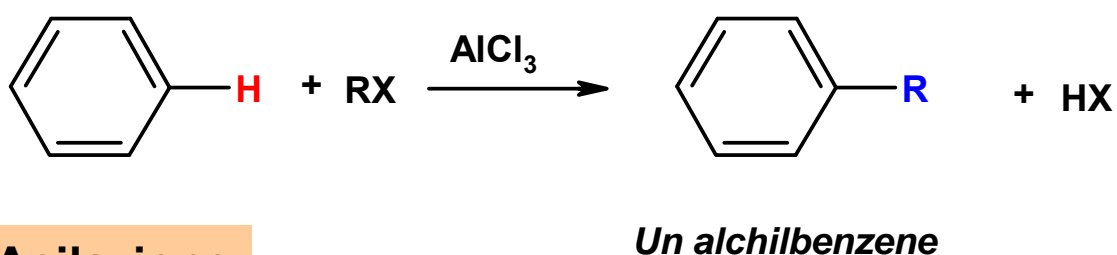
Nitrazione



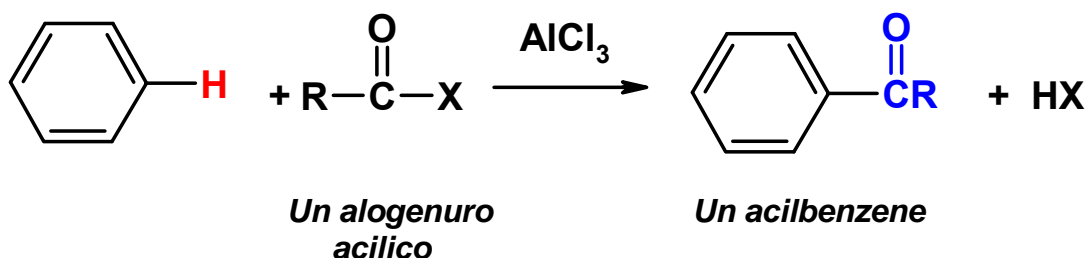
Solfonazione



Alchilazione

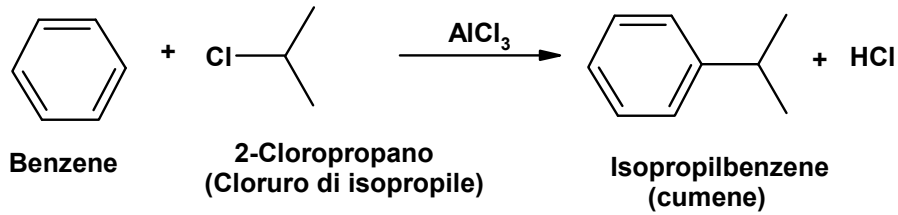


Acilazione

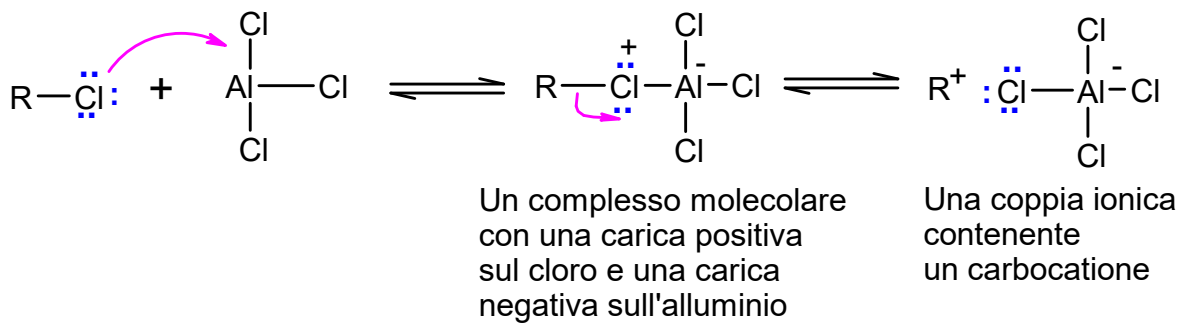


Alchilazione di Friedel-Crafts

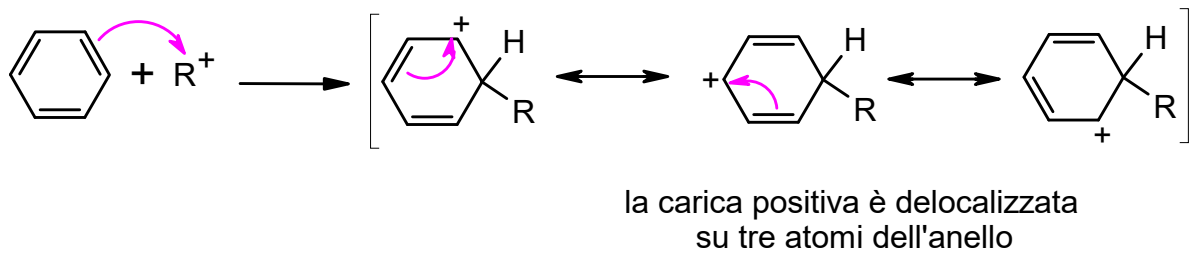
Esempio



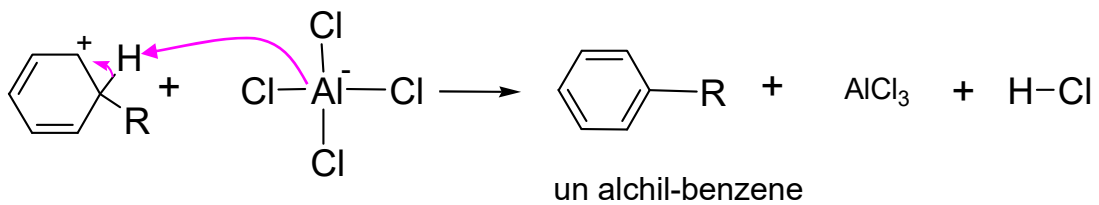
Stadio 1: Generazione elettrofilo



Stadio 2: Attacco dell'elettrofilo



Stadio 3: Transfer protonico



La reazione può essere condotta solo su alogenuri che danno carbocationi stabili (2° o 3°)