CHIMICA GENERALE ED INORGANICA E LABORATORIO

cod. 00966

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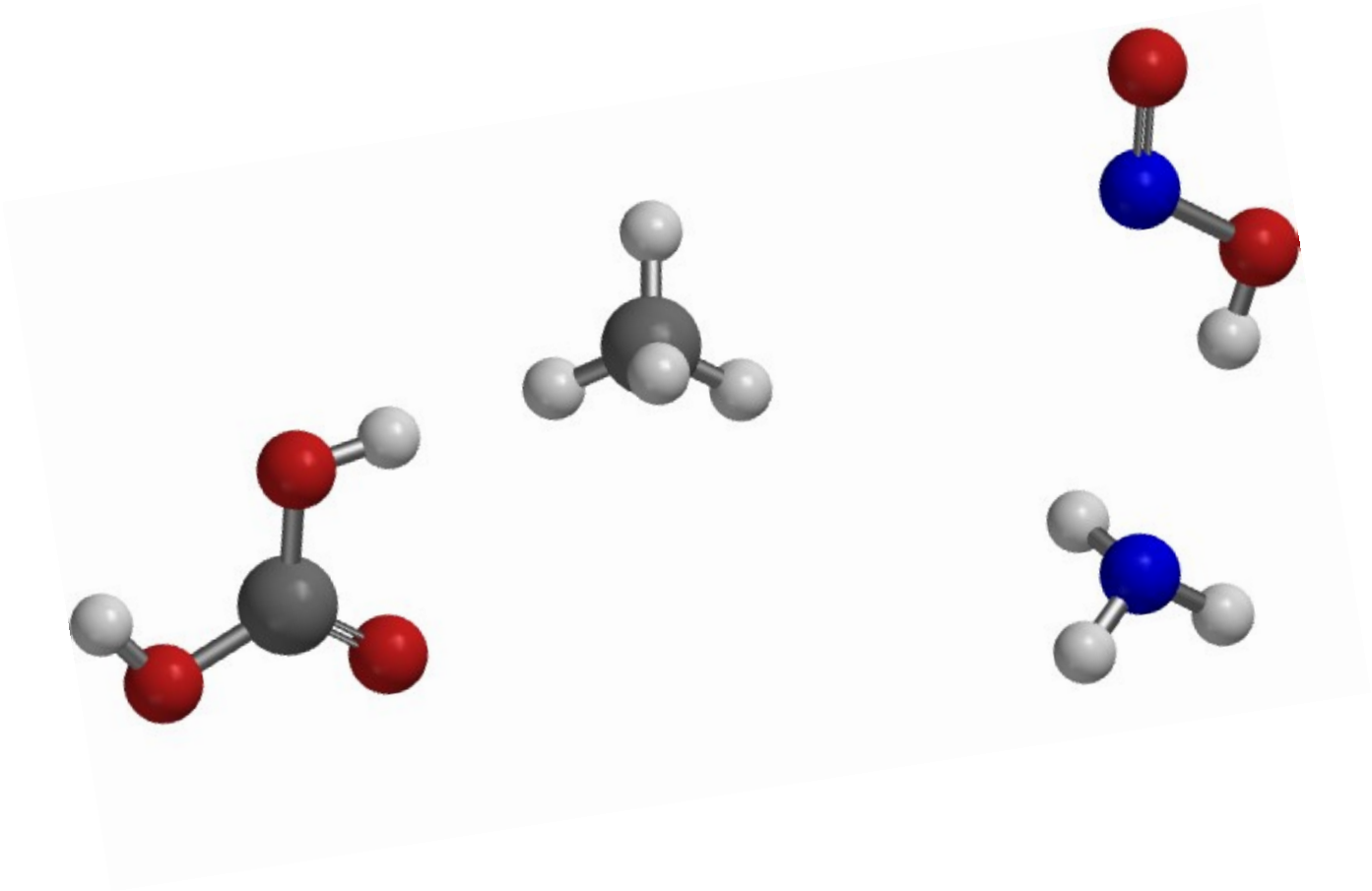
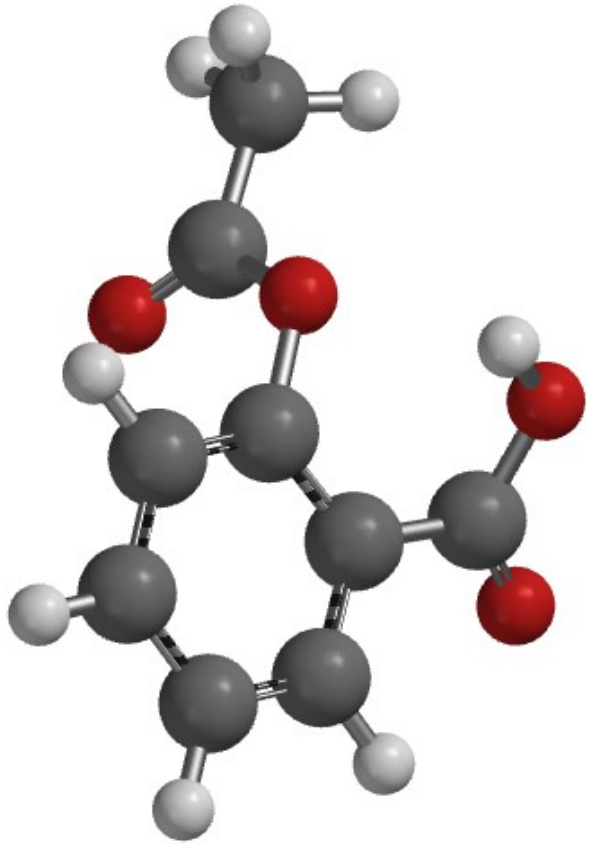
Lezione 7

- Teoria VSEPR
- Orbitali ibridi

Che forma hanno le molecole?





Che forma hanno le molecole?
VSEPR (Valence Shell Electron Pair Repulsion) – Repulsione delle coppie elettroniche nel guscio di valenza:

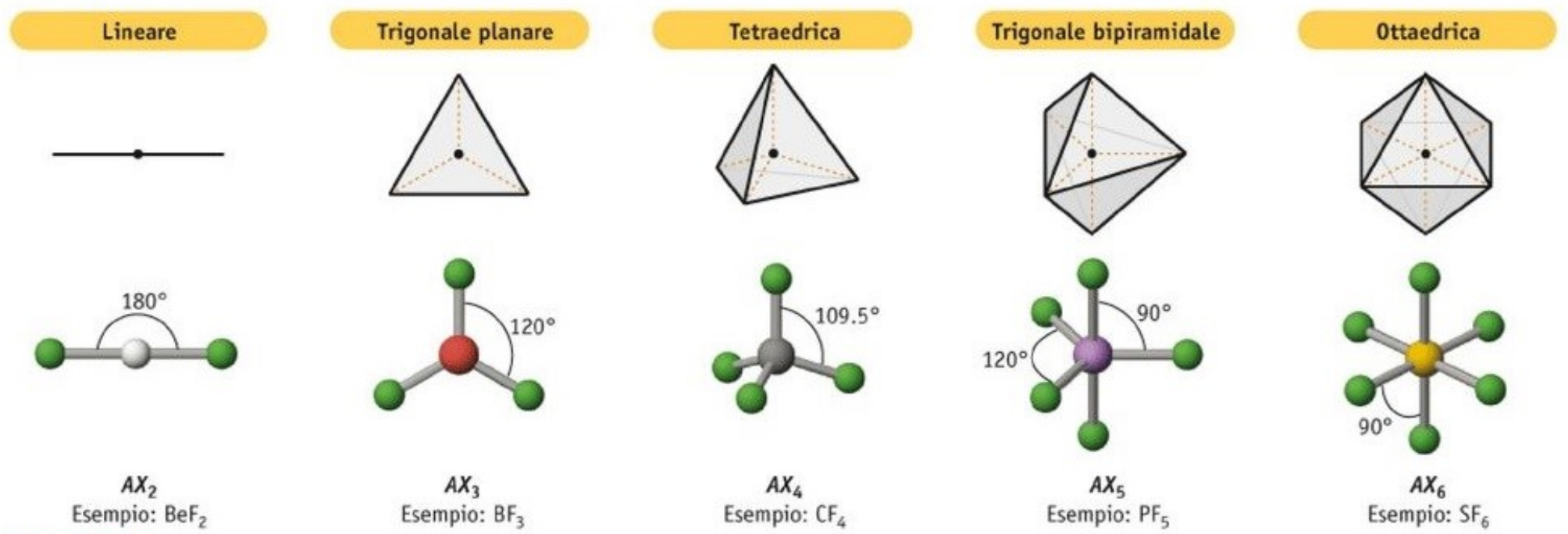
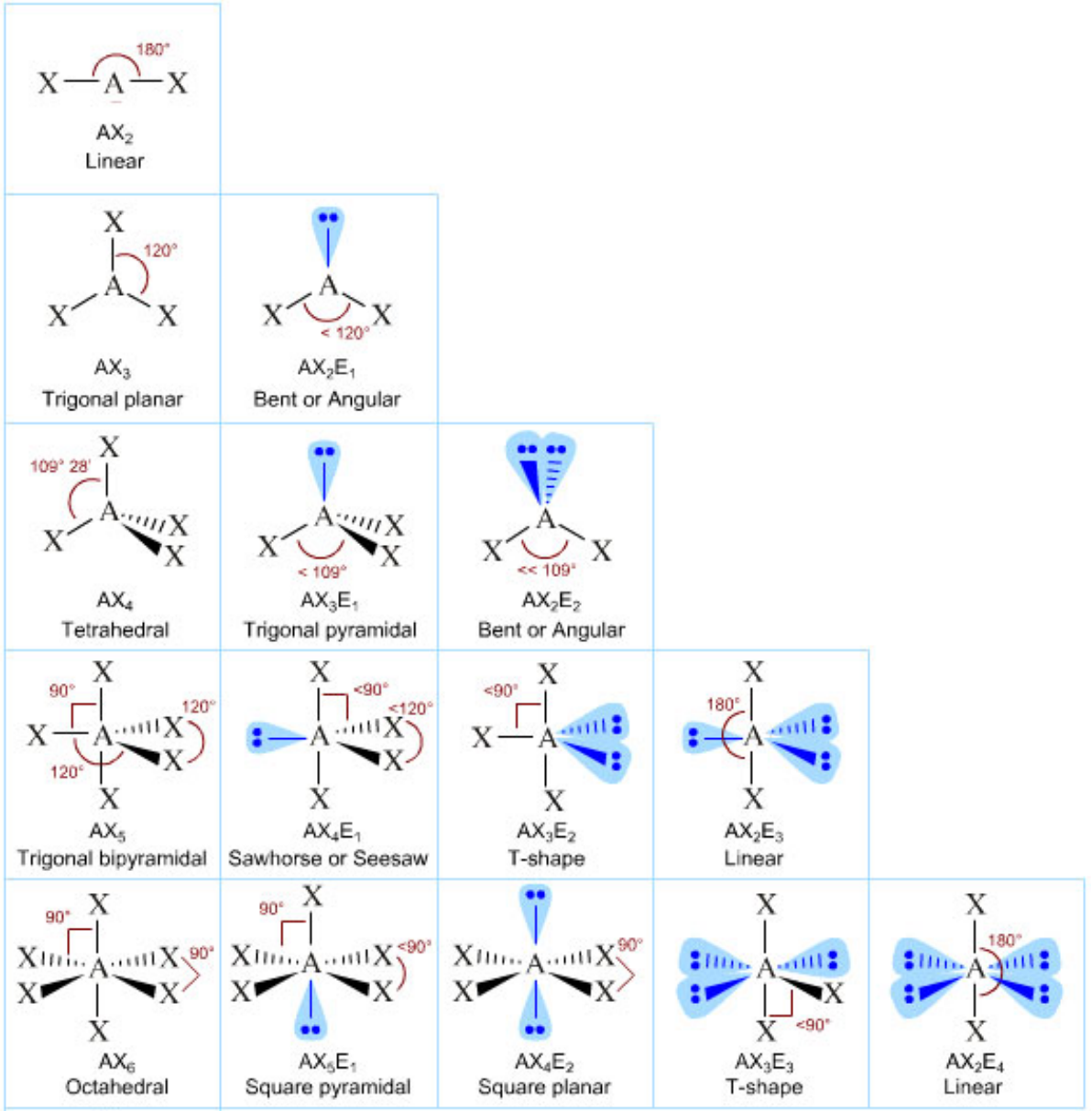


FIGURA 8.5 Varie geometrie previste dal modello VSEPR. Geometrie previste dalla teoria VSEPR per molecole che contengono solo legami covalenti singoli attorno all'atomo centrale.

VSEPR:


180°
AX2
Linear
120°
AX3
Trigonal planar
< 120°
AX2E1
Bent or Angular
109° 28'
AX4
Tetrahedral
< 109°
AX3E1
Trigonal pyramidal
<< 109°
AX2E2
Bent or Angular
90°
120°
120°
AX5
Trigonal bipyramidal
<90°
<120°
AX4E1
Sawhorse or Seesaw
<90°
AX3E2
T-shape
180°
AX2E3
Linear
90°
90°
AX6
Octahedral
90°
<90°
AX5E1
Square pyramidal
90°
AX4E2
Square planar
<90°
AX3E3
T-shape
180°
AX2E4
Linear

Che forma hanno le molecole?
VSEPR (Valence Shell Electron Pair Repulsion) – Repulsione delle coppie elettroniche nel guscio di valenza:

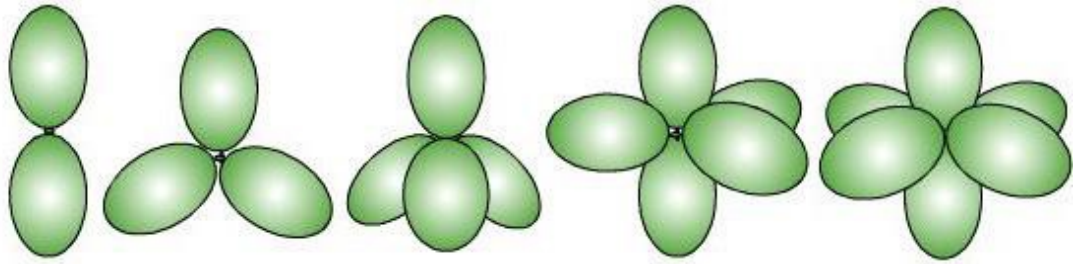
1 - Sommare il numero di coppie solitarie al numero di legami formati (i legami multipli valgono 1).

2 - Questo numero determina il poliedro regolare che ai vertici del quale si disporranno gli atomi periferici e le coppie solitarie (**geometria elettronica**).

3 - Considerare le coppie solitarie come "invisibili" al fine di determinare la **geometria** definitiva.

VSEPR esempi:

- $BeCl_2$; BF_3; CF_4; PF_5; SF_6.

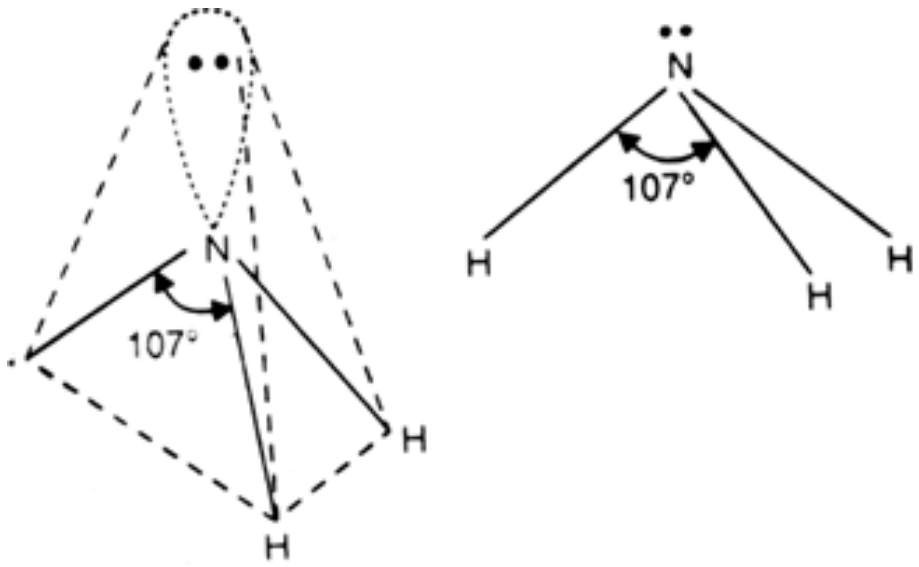


- NH_3; H_2O; SF_4; IF_3; XeF_2; XeF_4; BrF_5.

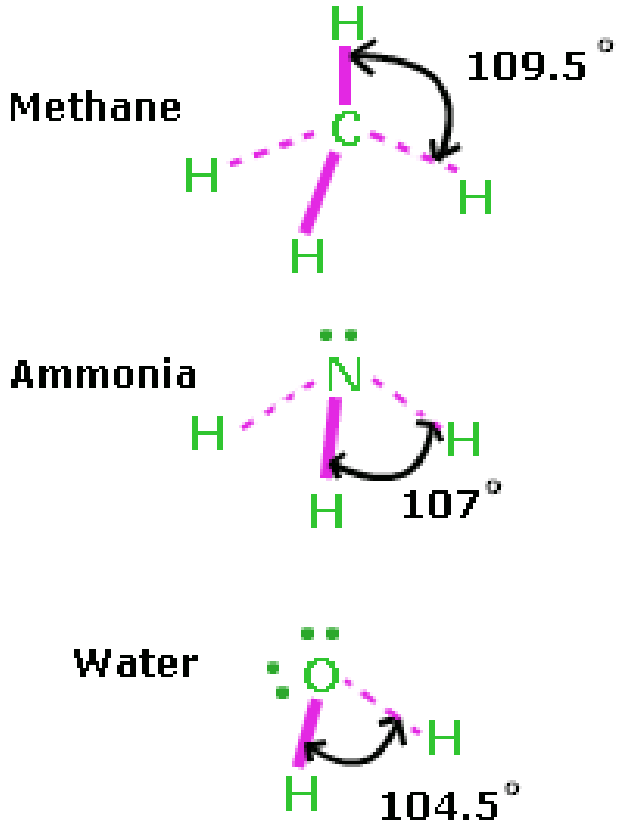
- CO_2; SO_3^{2-}; ClO_2^-.

VSEPR, repulsione delle coppie solitarie.

- CH_4; NH_3; H_2O.

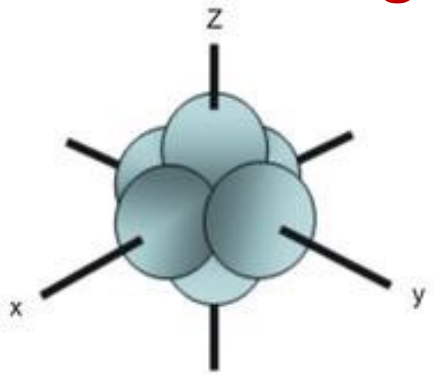


Distorted tetrahedral

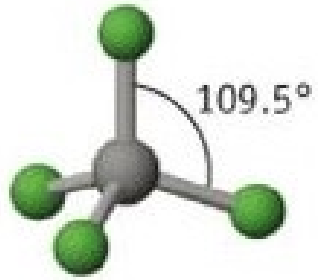


Ibridazione degli orbitali - sp3:

Teoria del legame di valenza

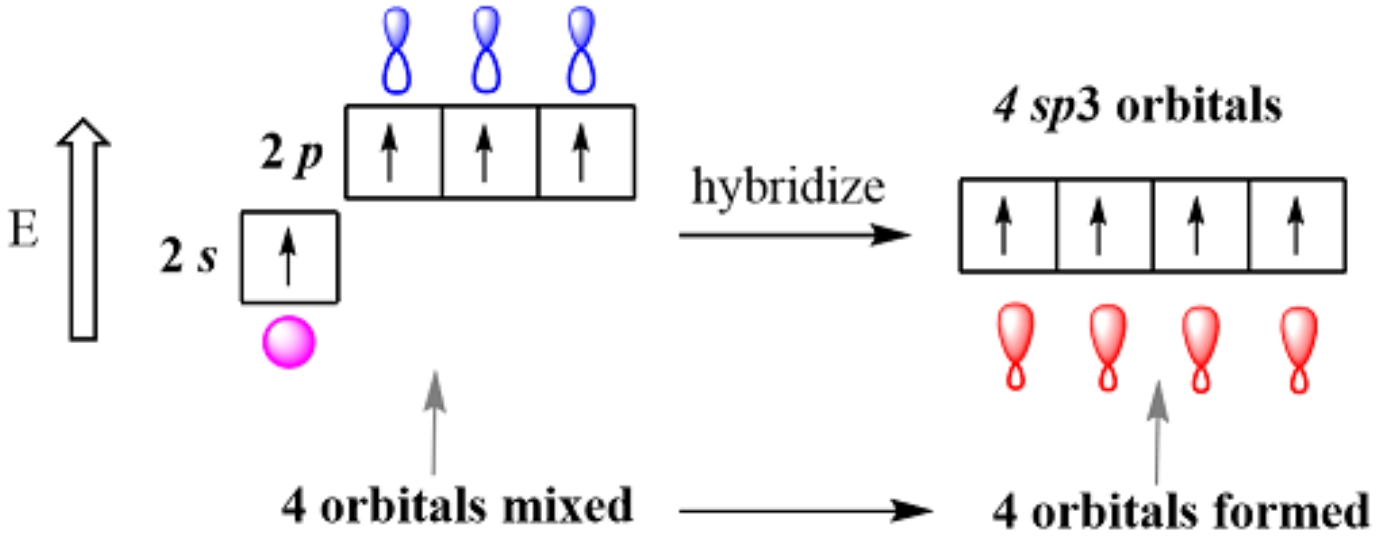


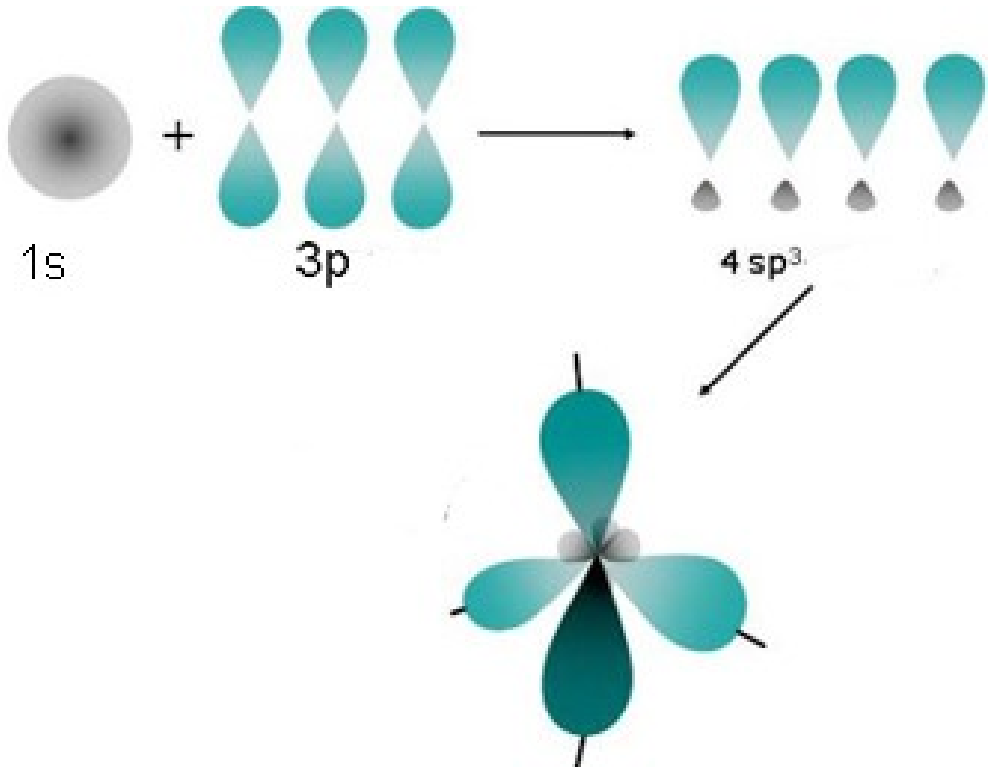
VSEPR



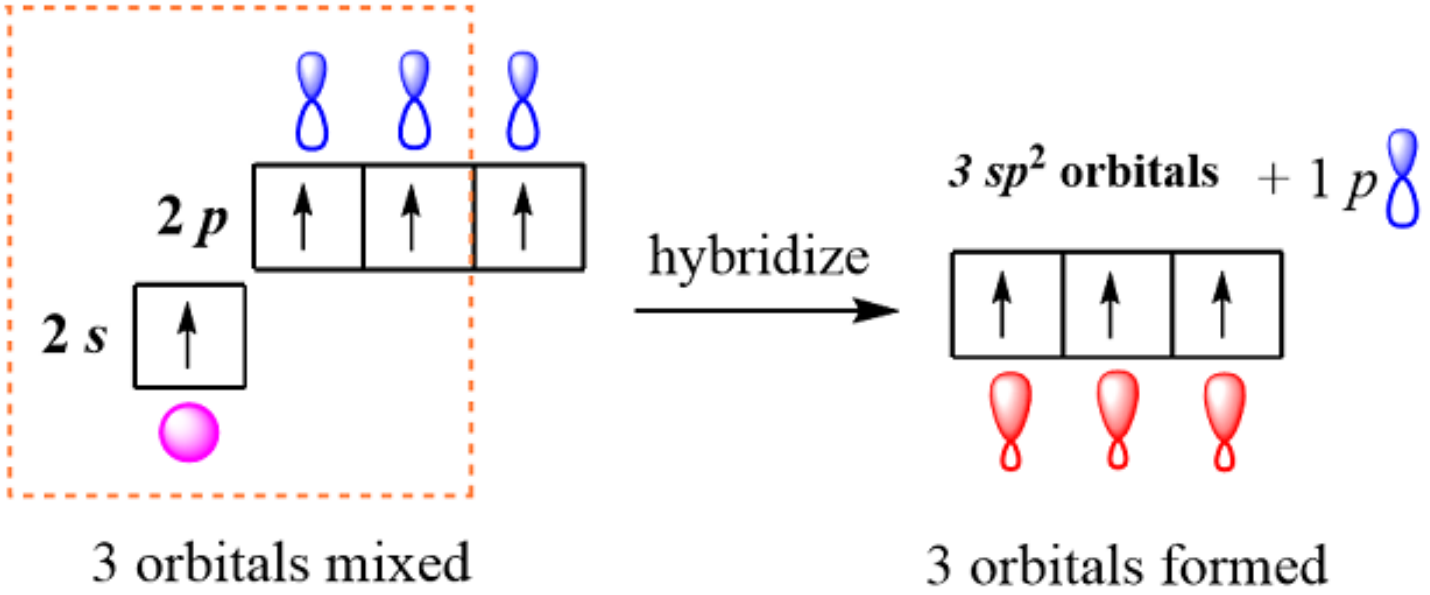
Ibridazione

Ibridazione degli orbitali - sp3:



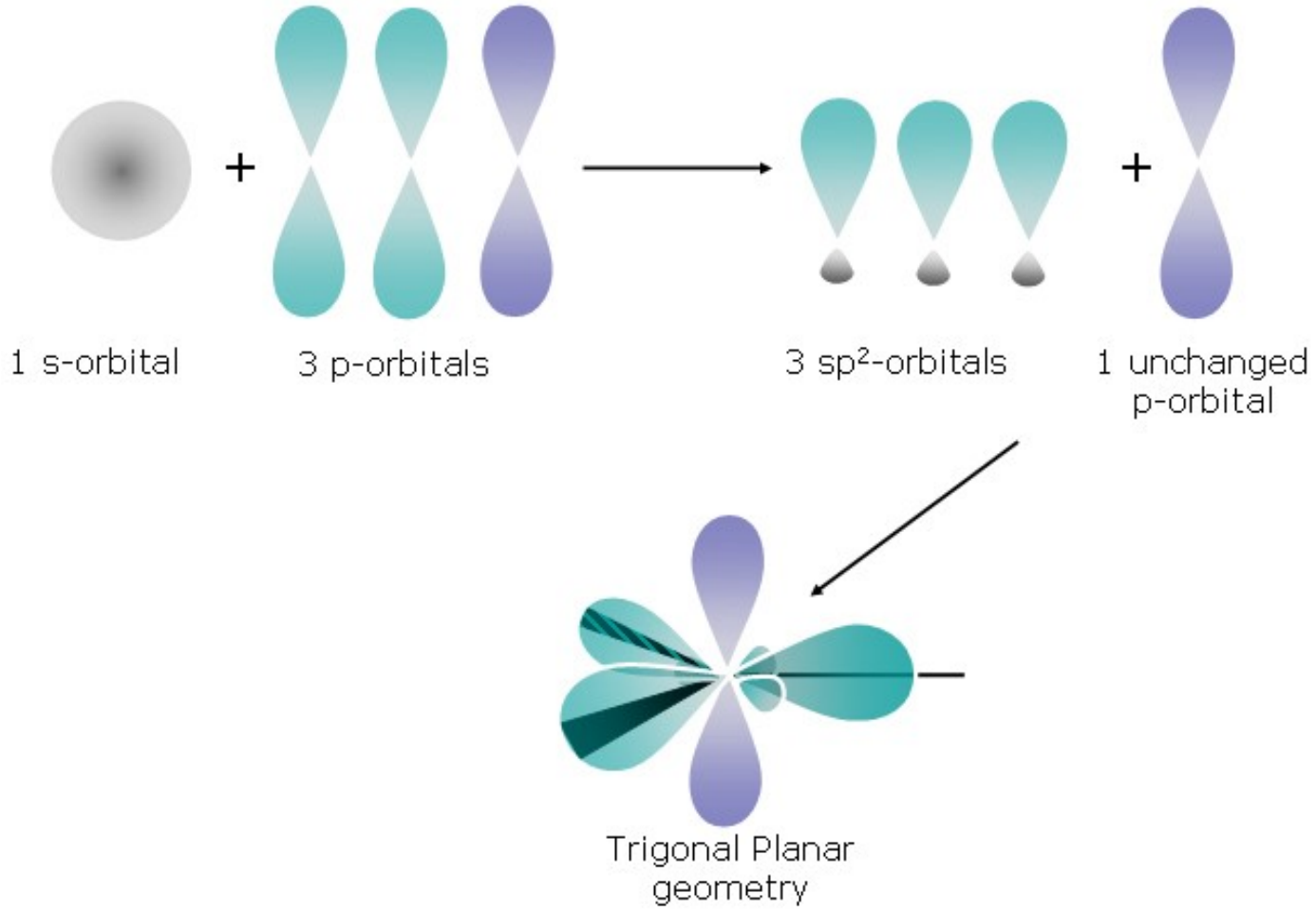


Ibridazione degli orbitali - sp2:



1 orbitale *p* per fare legami π
(**1 doppio legame**)

Ibridazione degli orbitali - sp2:



1 orbitale *p* per fare legami π
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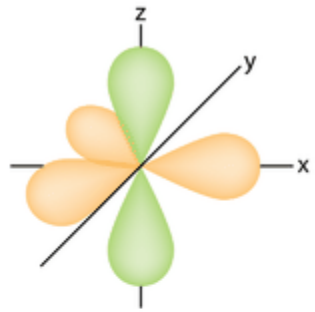
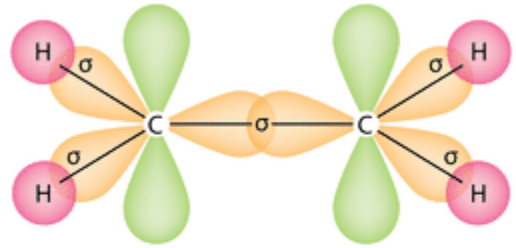
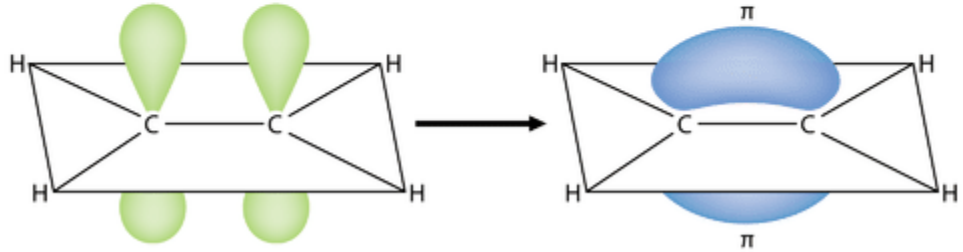


The set of orbitals $sp^2 + p$

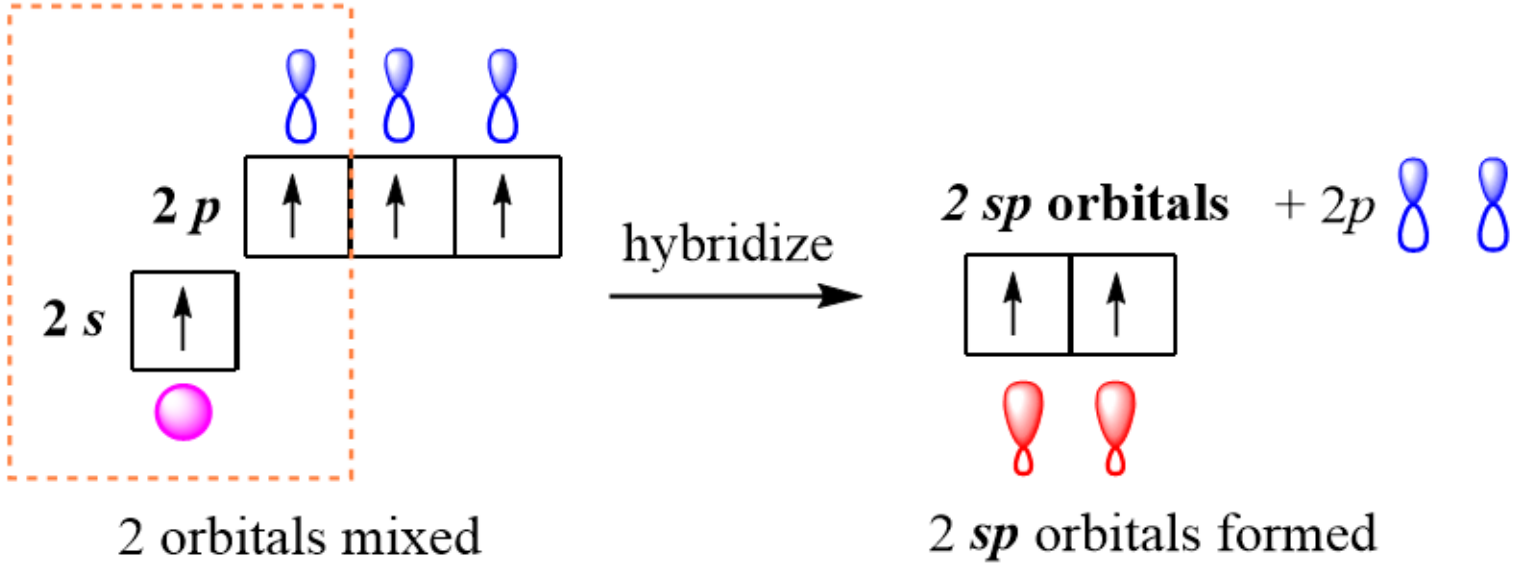


Sigma (σ) bond



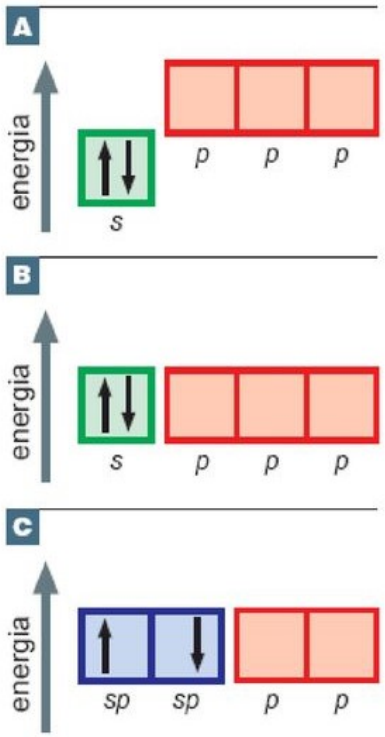
Overlap of *p* orbitals leading to pi (π) bond

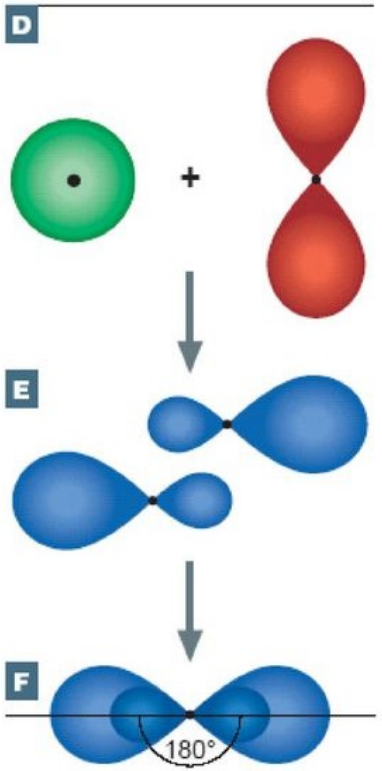
Ibridazione degli orbitali - sp:

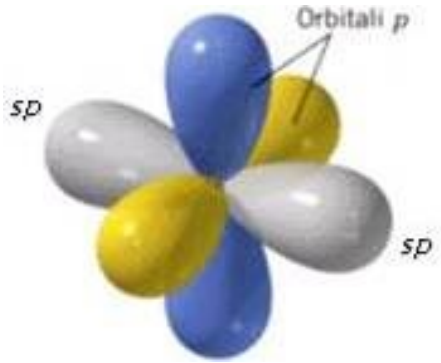


2 orbitale *p* per fare 2 legami π (**1 triplo legame o 2 doppi legami**)

Ibridazione degli orbitali - sp:







2 orbitale *p* per fare 2 legami π (**1 triplo legame o 2 doppi legami**)