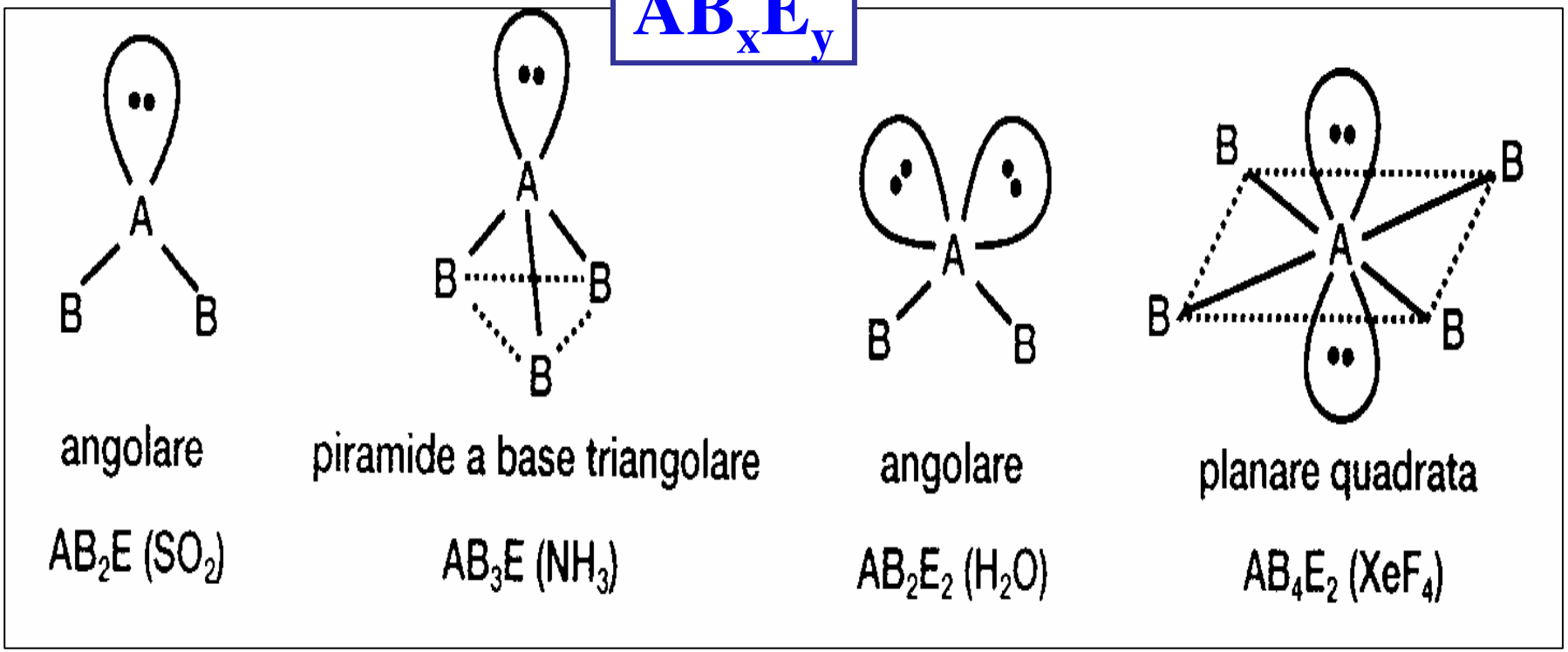
Geometria molecolare
La teoria VSEPR

Geometria molecolare

La teoria VSEPR (Valence Shell Electron Pair Repulsion o teoria della repulsione delle coppie elettroniche del guscio di valenza)

Le coppie elettroniche del guscio di valenza presenti sull'ATOMO CENTRALE della molecola o dello ione tendono a disporsi il più lontano possibile le une dalle altre

AB_xE_y



Per ogni legame multiplo si considera una sola coppia elettronica

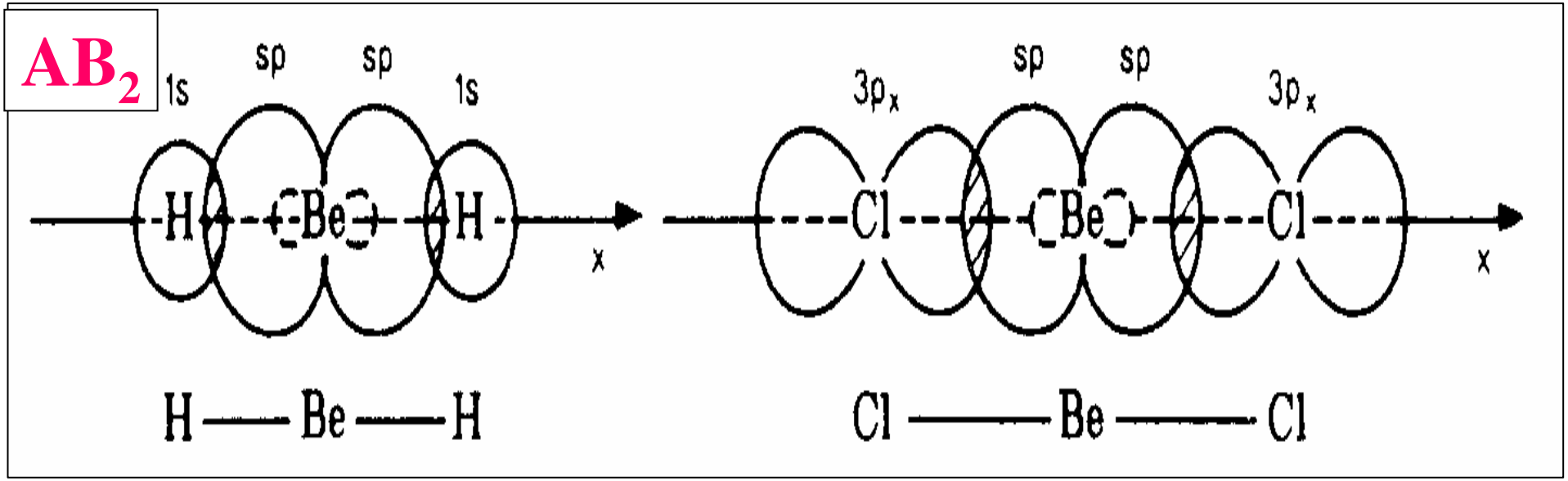
Geometria molecolare - La teoria VSEPR

Gruppo I: solo composti ionici

Gruppo II: Be

$2s^2 \rightarrow 2s^1 2p^1 \rightarrow 2(sp)^2$

BeX_2

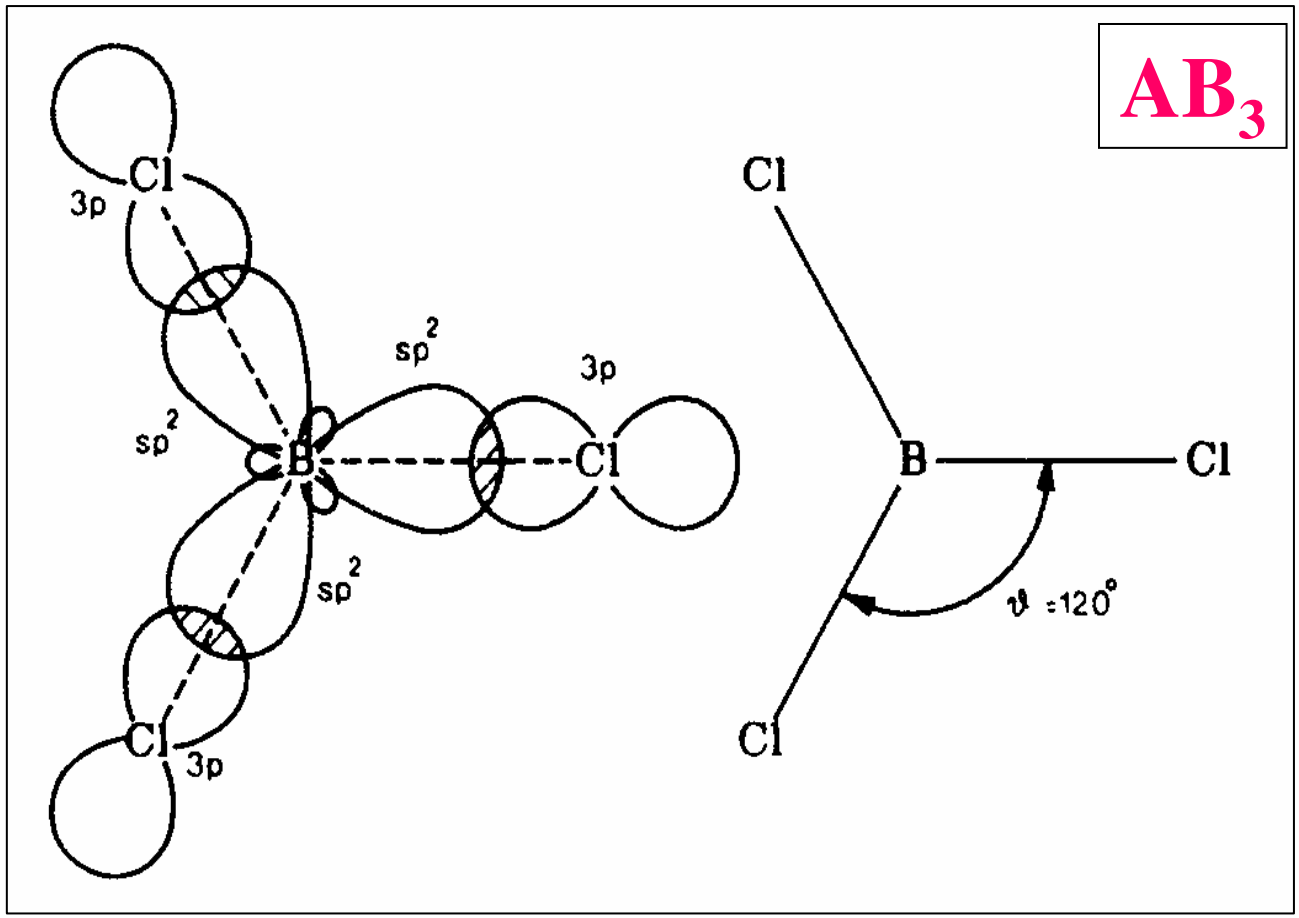


Geometria molecolare - La teoria VSEPR

Gruppo III: MX_3

M = B, Al, Ga, In

$ns^2np^1 \rightarrow ns^1np^2 \rightarrow n(sp^2)^3$



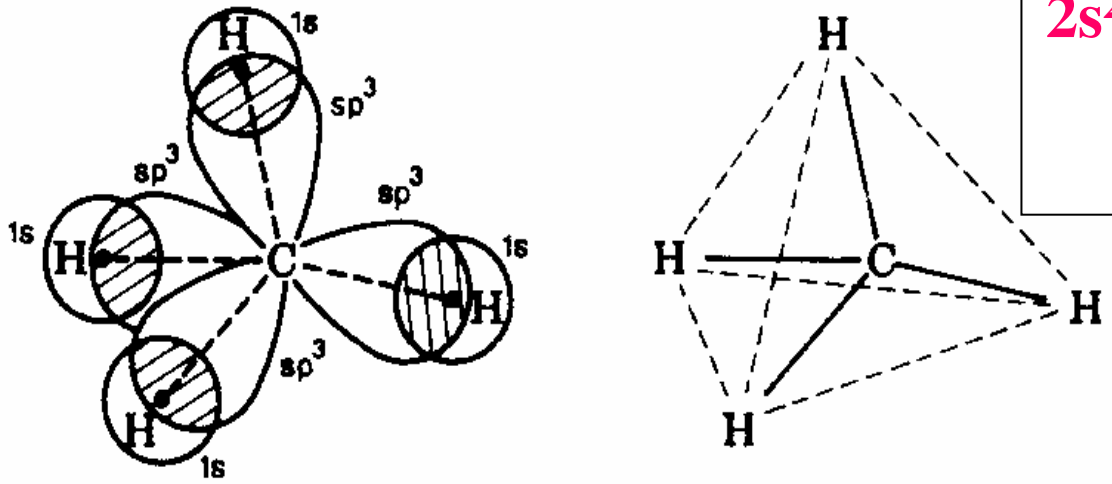
Geometria molecolare - La teoria VSEPR

Gruppo IV: C

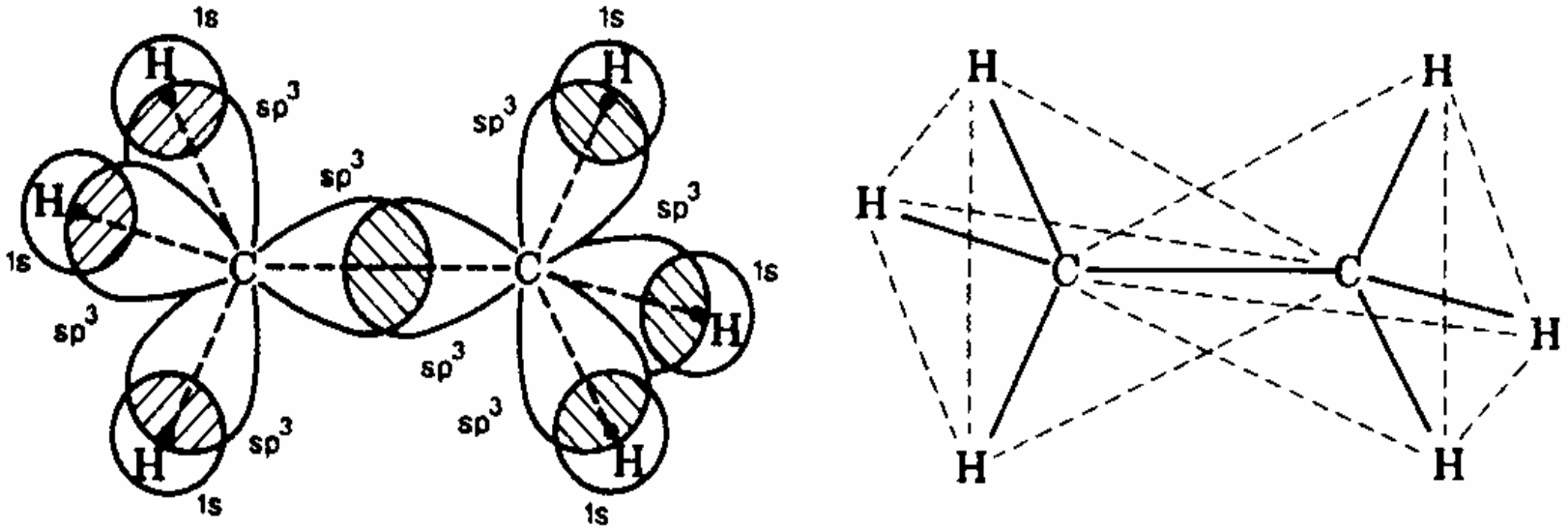
$2s^2 2p^2 \rightarrow 2s^1 2p^3$

$\rightarrow 2(sp^3)^4$

CH_4, C_2H_6

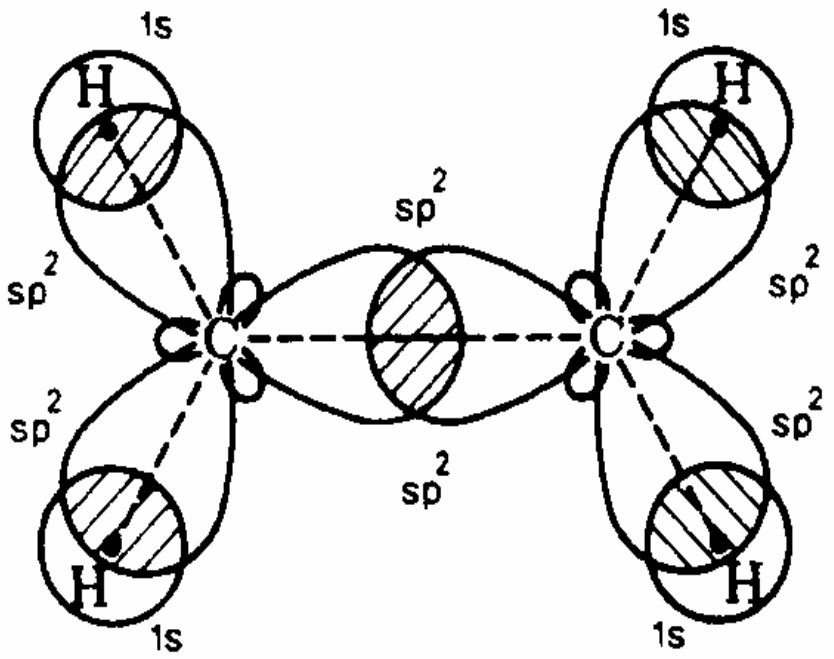


(a)

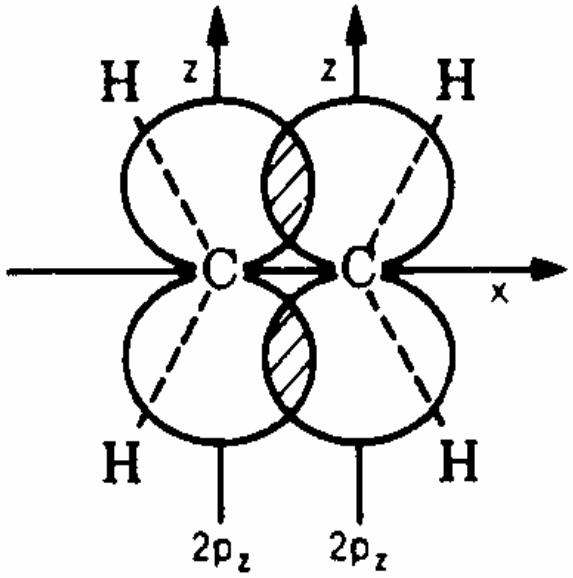


(b)

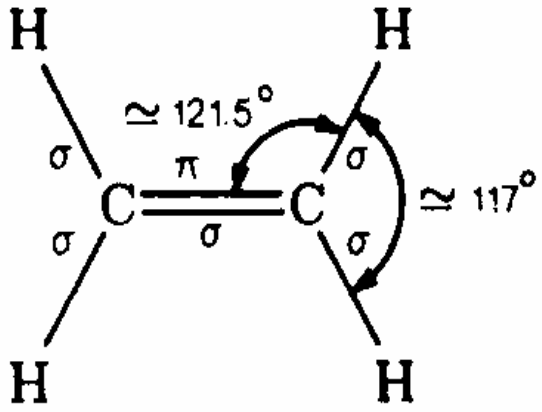
Geometria molecolare - La teoria VSEPR



(a)



(b)



Gruppo IV: C

$2s^2 2p^2 \rightarrow 2s^1 2p^3 \rightarrow 2(sp^2)^3 2p^1$

C_2H_4

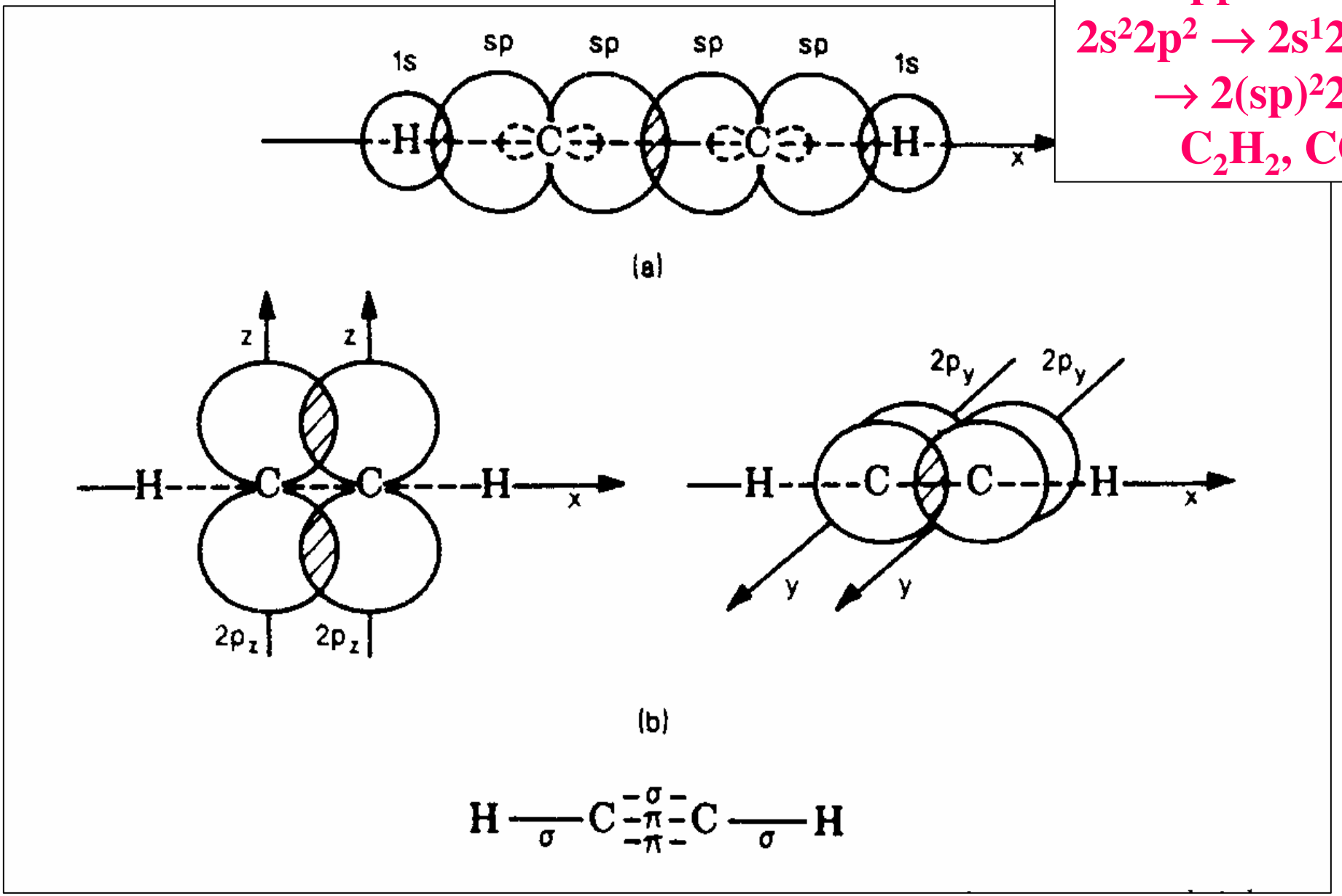
Geometria molecolare - La teoria VSEPR

Gruppo IV: C

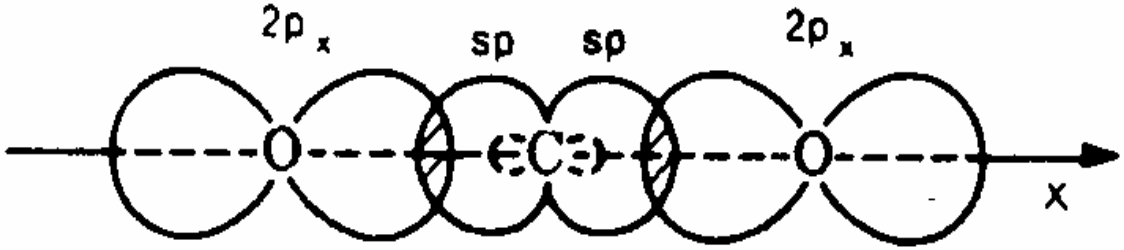
$2s^2 2p^2 \rightarrow 2s^1 2p^3$

$\rightarrow 2(sp)^2 2p^2$

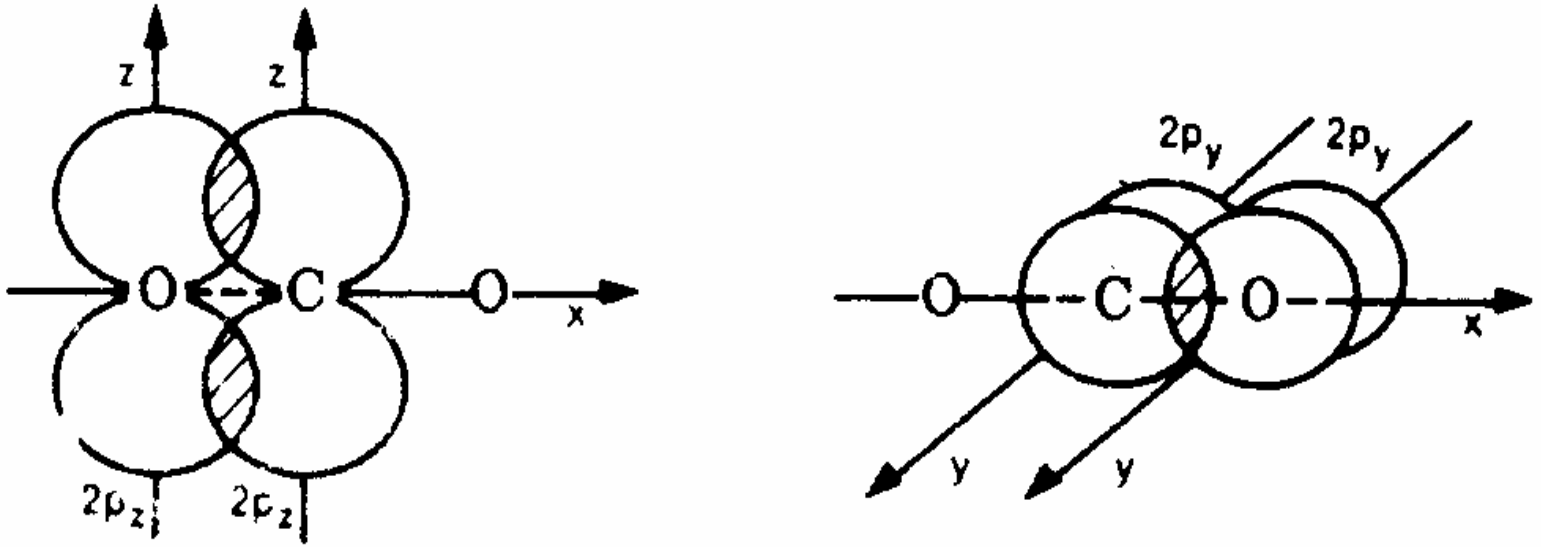
C_2H_2, CO_2



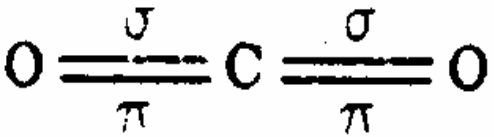
Geometria molecolare - La teoria VSEPR



(a)



(b)



Gruppo IV: C

$2s^2 2p^2 \rightarrow 2s^1 2p^3 \rightarrow 2(sp)^2 2p^2$

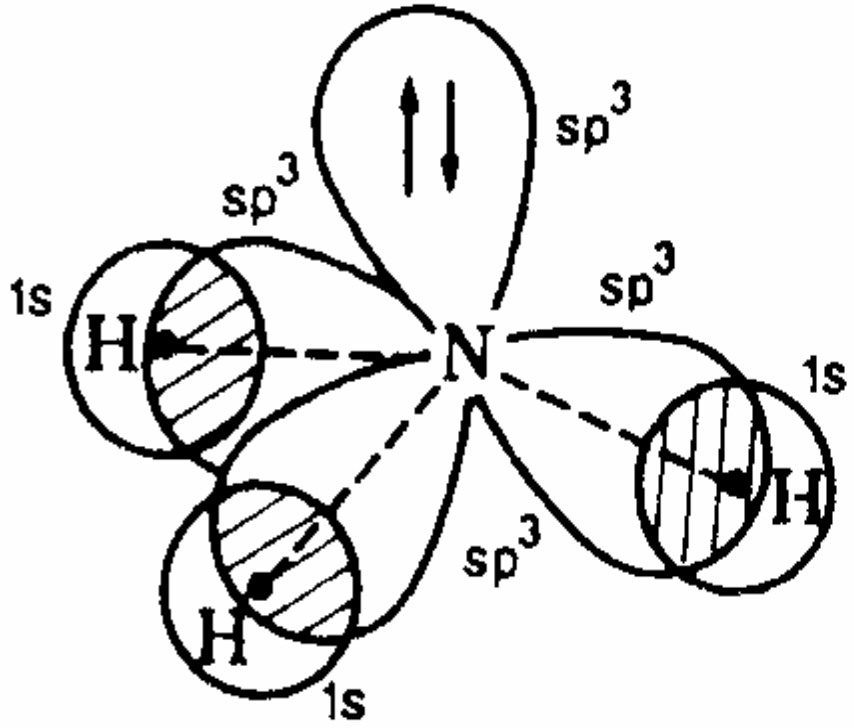
C_2H_2, CO_2

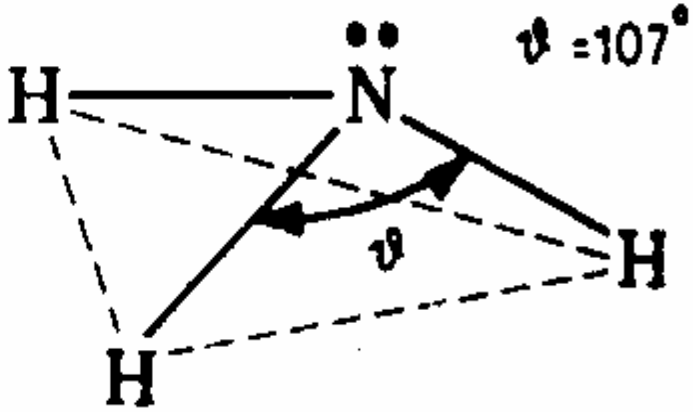
Geometria molecolare - La teoria VSEPR

Gruppo V: N
$2s^2 2p^3 \rightarrow 2(sp^3)^5$
NH_3

AB_3E

Piramide a base triangolare

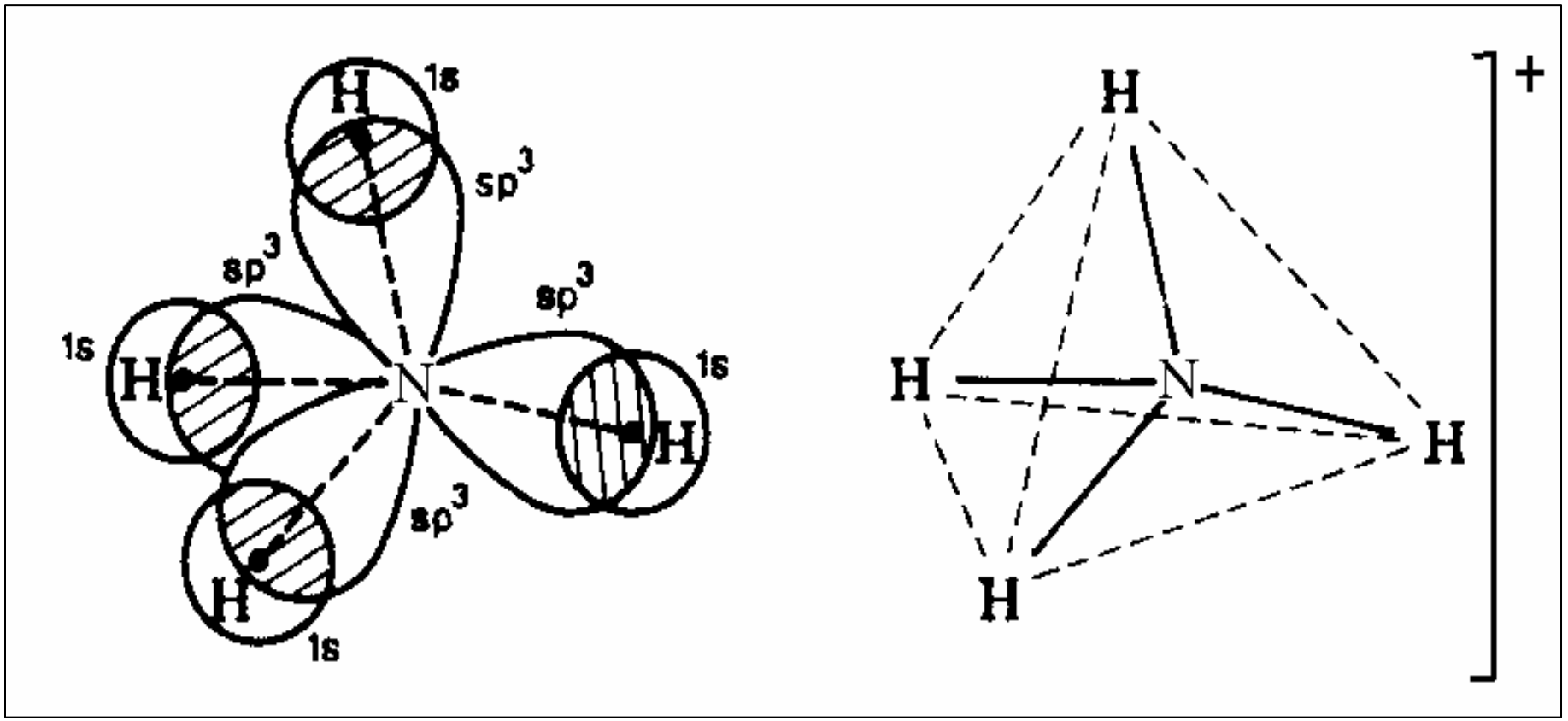




Geometria molecolare - La teoria VSEPR

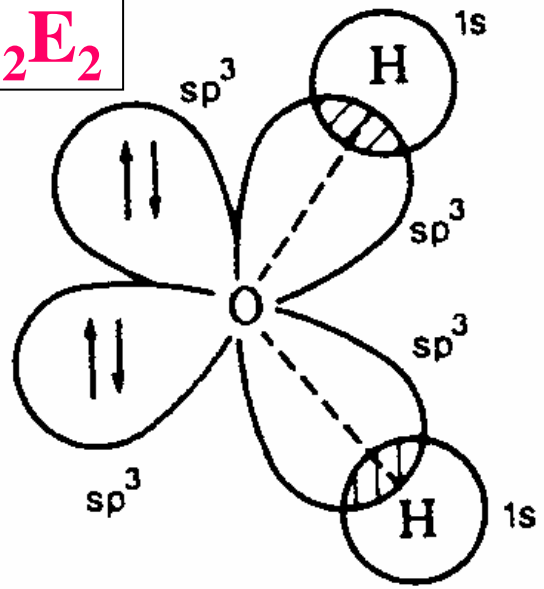
Gruppo V: N

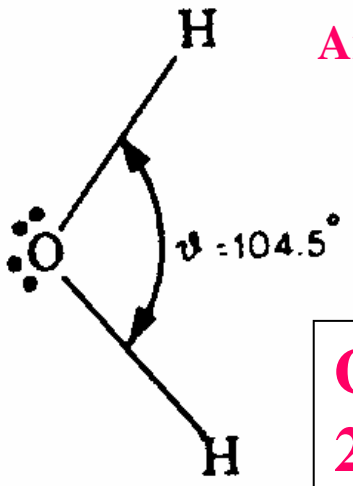
$NH_3 + H^+ \rightarrow NH_4^+$



Geometria molecolare - La teoria VSEPR

AB_2E_2





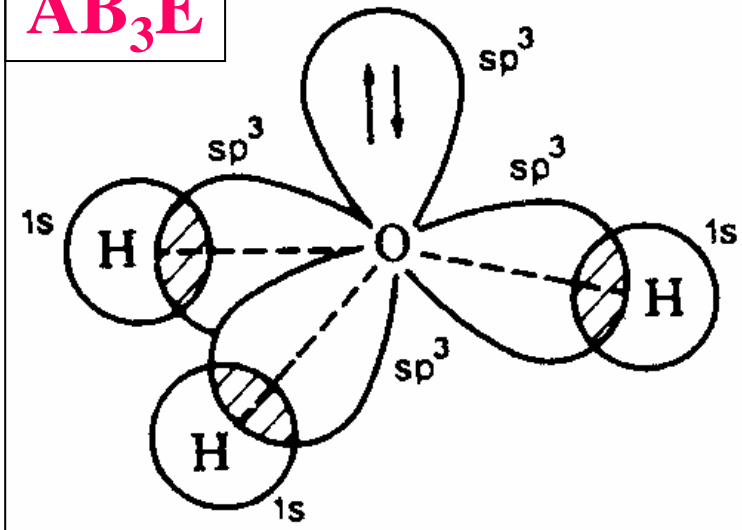
Angolare

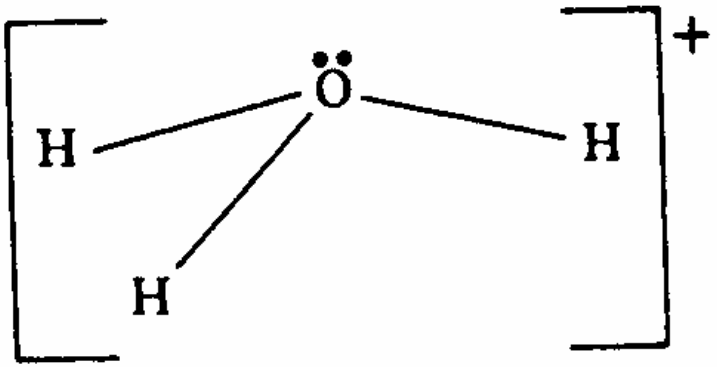
Gruppo VI: O

$2s^2 2p^4 \rightarrow 2(sp^3)^6$

H_2O

AB_3E





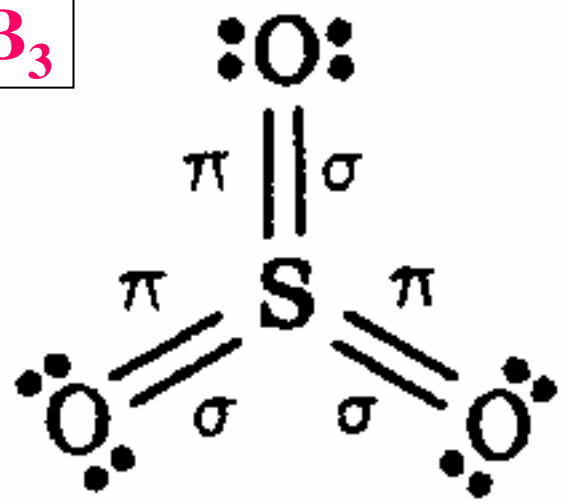
Geometria molecolare - La teoria VSEPR

Gruppo VI: S

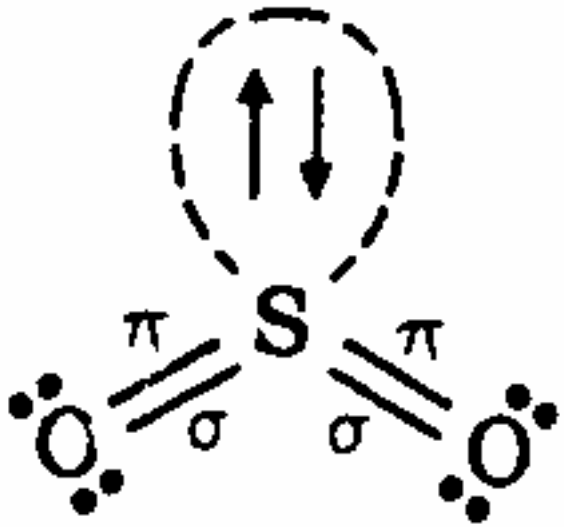
$3s^2 3p^4 \rightarrow 3s^2 3p^3 3d^1$ SO_2

$3s^2 3p^4 \rightarrow 3s^1 3p^3 3d^2$ SO_3

AB_3



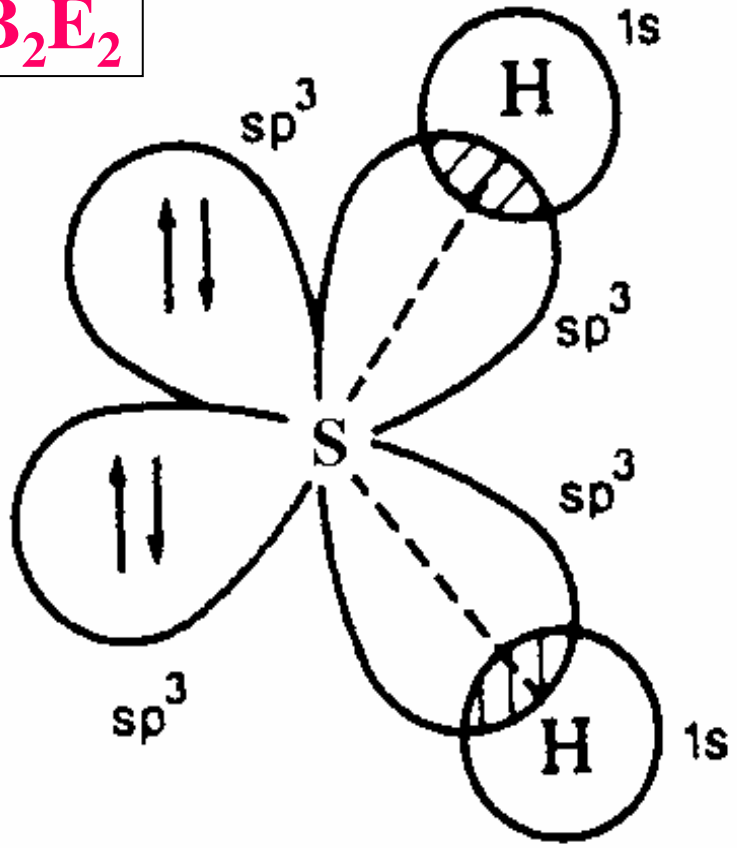
AB_2E



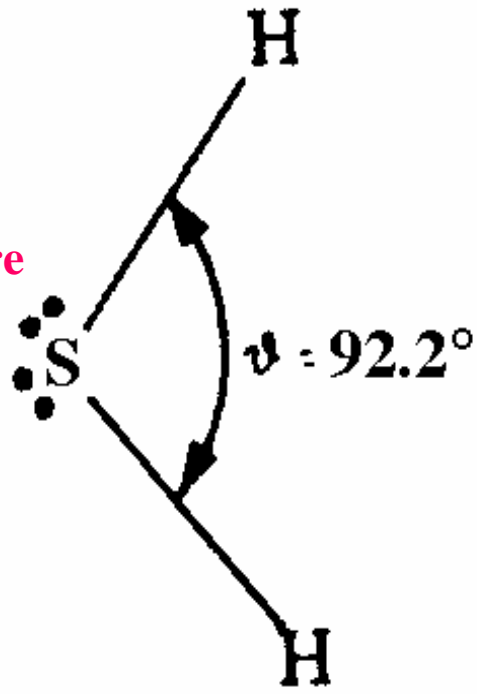
Geometria molecolare - La teoria VSEPR

Gruppo VI: S
$3s^2 3p^4 \rightarrow 3(sp^3)^6$
H_2S

AB_2E_2



Angolare



Geometria molecolare - La teoria VSEPR

Gruppo VII:

$ns^2np^5 \rightarrow ns^2np^5$	Cl_2, HF, HCl, HBr, …, ClO^-
$ns^2np^5 \rightarrow ns^2np^4nd^1$	ClO_2^-
$ns^2np^5 \rightarrow ns^2np^3nd^2$	ClO_3^-
$ns^2np^5 \rightarrow ns^1np^3nd^3$	ClO_4^-