CO_2, CH_4, H_2O, NH_3

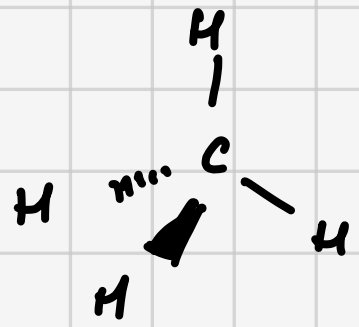
$\chi(C) < \chi(O)$

- CO_2 : $\overset{\delta^-}{O} = \overset{\delta^+}{C} = \overset{\delta^-}{O}$; bien $\overset{-\delta}{O} \rightarrow \overset{+2\delta}{C} \leftarrow \overset{-\delta}{O}$

$\vec{p}$ $\vec{p}'$

$\vec{p} + \vec{p}' = \vec{0}$

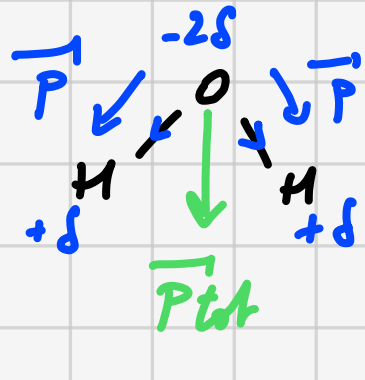
- CH_4 :



symétrie $\vec{p}_{tot} = \vec{0}$

$\chi(C) \simeq \chi(H)$

- H_2O :

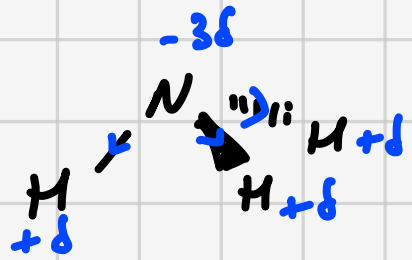


$\vec{p}$ $\vec{p}'$ $\vec{p}_{tot}$

ou $\vec{p} + \vec{p}' \neq \vec{0}$

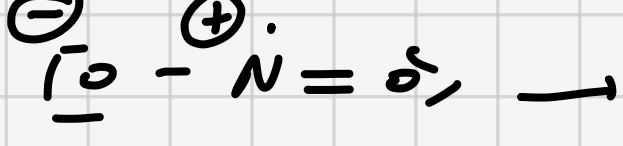
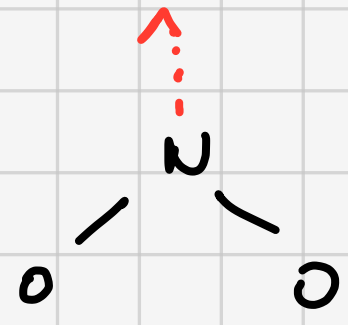
$\Rightarrow$ molécule polaire

- NH_3 :



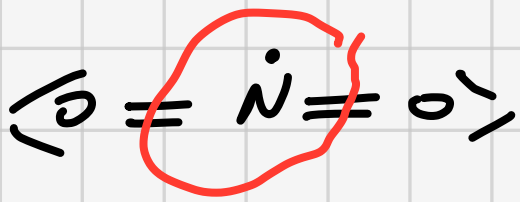
$\delta << 1$ car $\chi(N) \gtrsim \chi(H)$

$\vec{p}_{tot} \neq \vec{0}$

$NO_2 \longrightarrow$  $\longrightarrow$ 

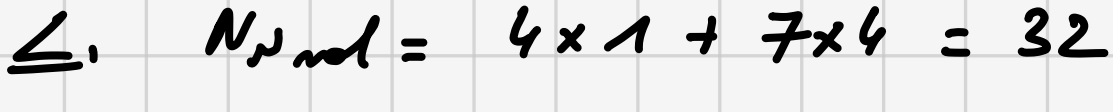
AX_2E_1

coudé



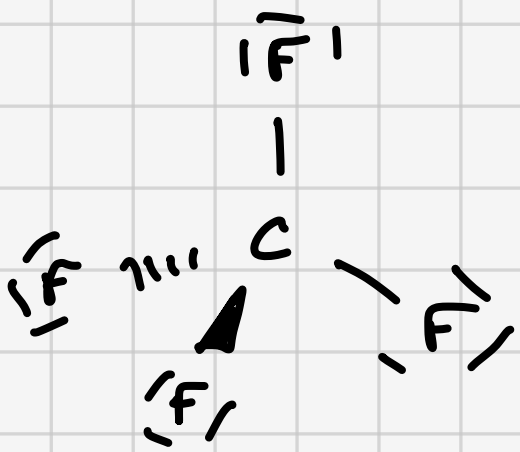
TD n°5 - Exercice n°1 :

- $CF_4 \longrightarrow$;

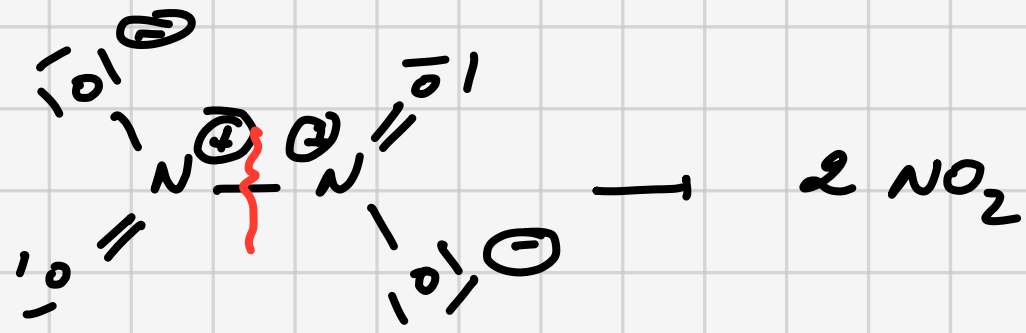


$N_I = \frac{1}{2}(6\times5+2-32) = 0$

Lewis  $\longrightarrow$ VSEPR AX_4E_0

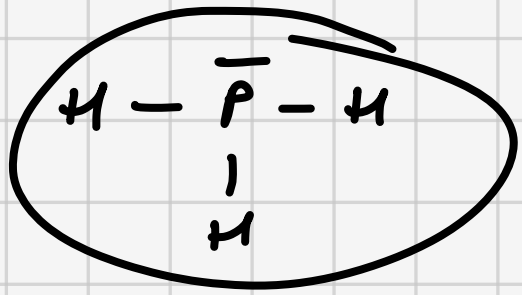
Cram :  tétraédrique

Rq :

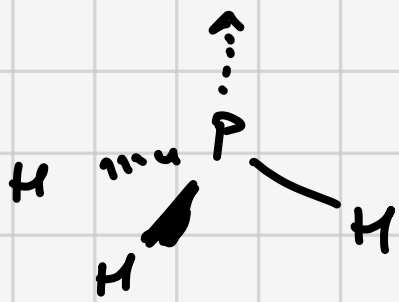


$\longrightarrow$ $2\,NO_2$

* PH_3 :

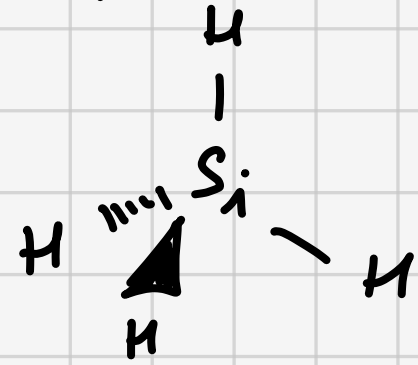


AX_3E_1 → pyramide à base triangulaire



* $\underline{Si}H_4$:

↳ même colonne que le carbone C.



* $MgCl_2$, $OPCl_3$

$MgCl_2$: $\|\underline{\dot{M}g}\cdot$; $|\underline{\bar{Cl}}\cdot$

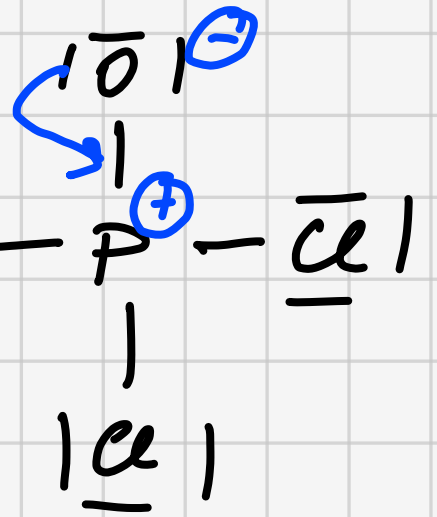
Lewis $|\underline{\bar{Cl}} - \underline{\underline{\bar{M}g}} - \underline{\bar{Cl}}|$ → VSEPR AX_2 linéaire

$Cl - \underline{\underline{Mg}} - Cl$

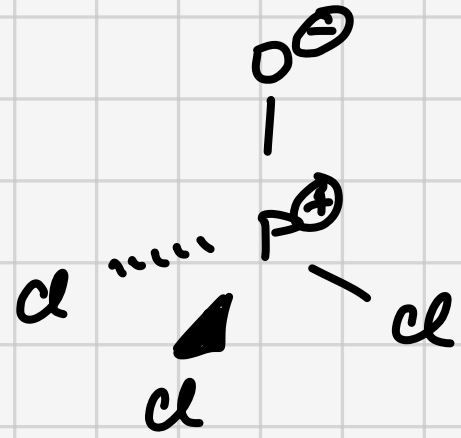
$OPCl_3$: $\cdot\underline{\overline{O}}\cdot$, $\cdot\underline{\overline{P}}\cdot$, $|\underline{\overline{Cl}}$

$N_{s,val} = 6\times1 + 5\times1 + 7\times3 = 32$ —, 16 doublets

$N_I = \frac{1}{2}(6\times5 + 2 - 32) = 0$ → pas de liaisons multiples



Lewis —, VSEPR : AX_4 tétraédrique

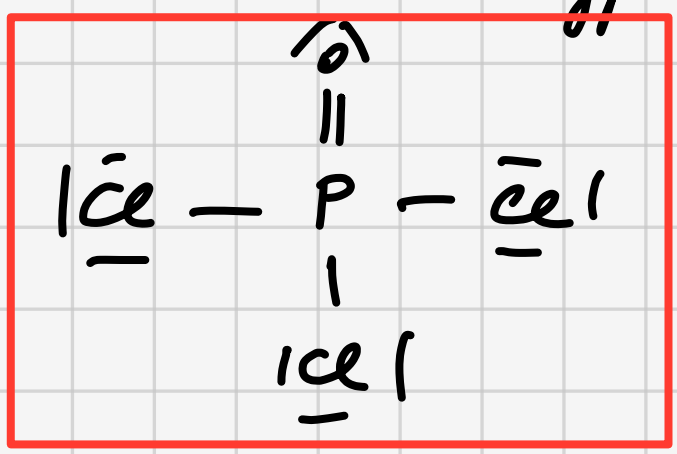


$\gamma_F(O) = 6 - 7 = -1$

$\gamma_F(P) = 5 - 4 = +1$

$\gamma_F(Cl) = 7 - 7 = 0$

Formes mésomères : hypervalence de P

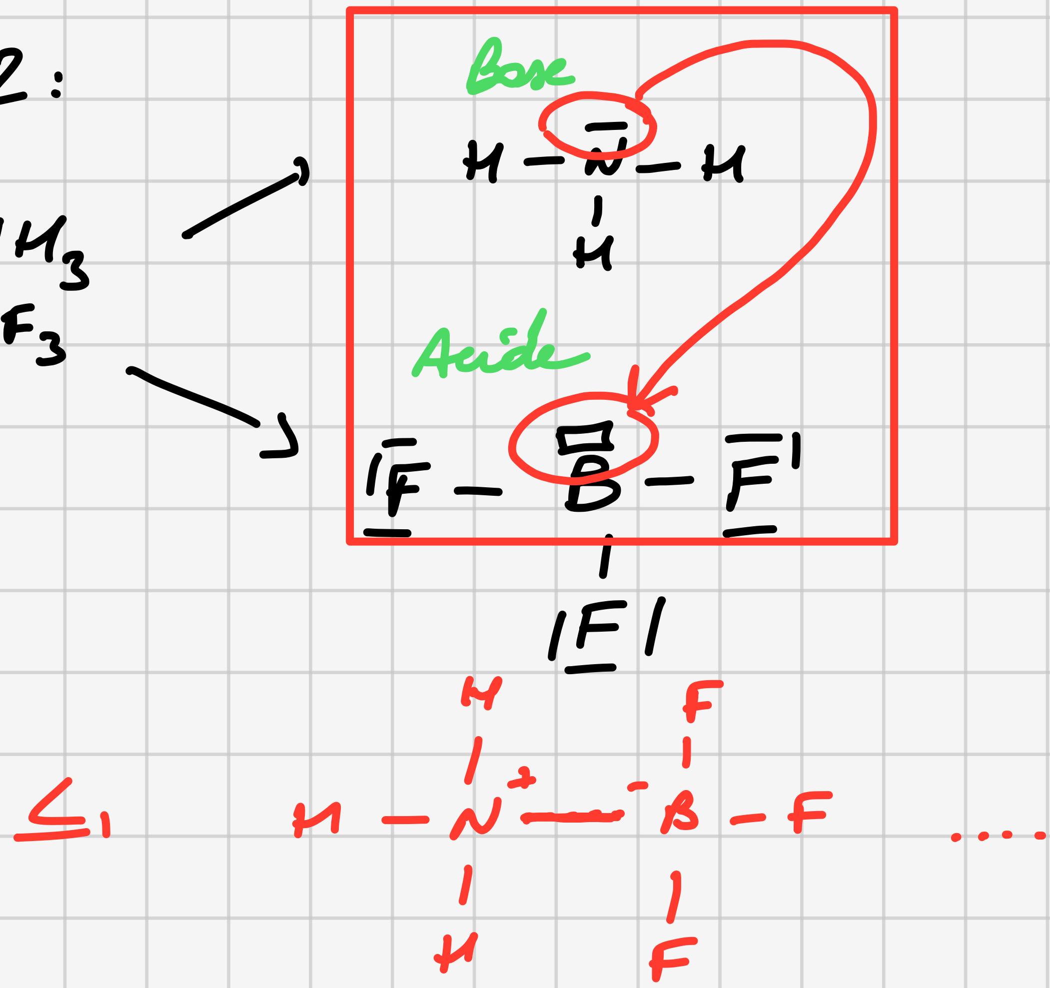


$\underline{AX_4}$ → tétraédrique

Exercice 2 :

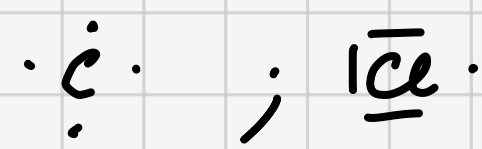
NH_3

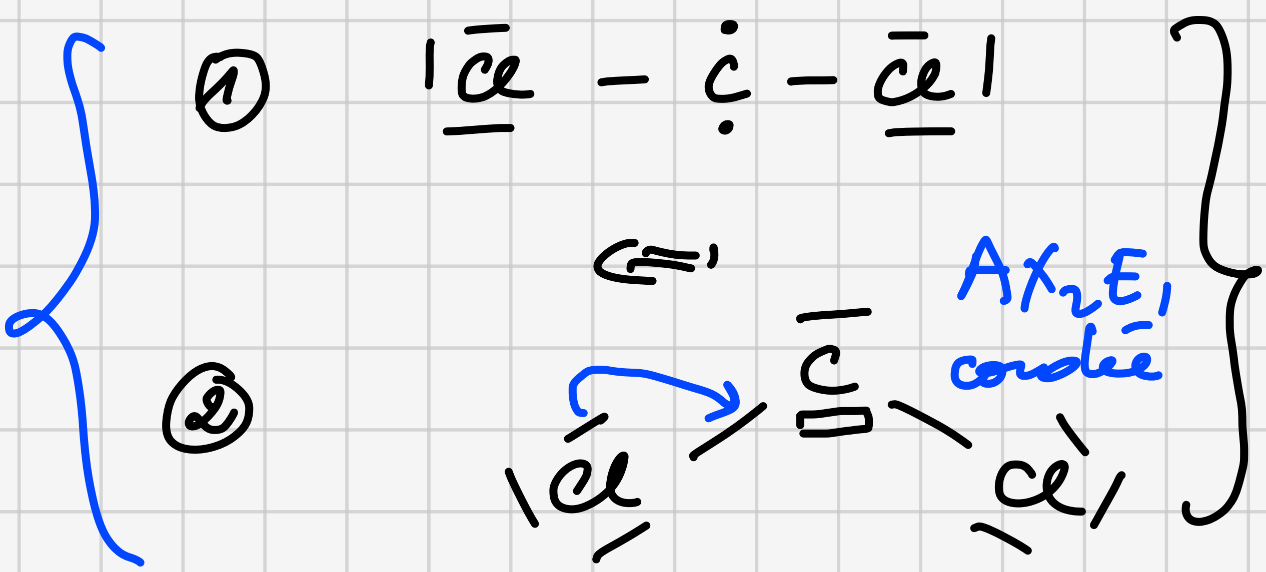
BF_3



Exercice 3 :

1°/ CCl_2 :





le carbone ne respecte pas ici la règle de l'octet.

⇒ e^- célib, doublet non liant ⇒ base de Lewis

Définition de Lewis : capte / donne des e^-

" de Brönsted : capte / donne un H^+

$AH \longrightarrow A^- + H^+$

↳ donneur de H^+ → acide Brönsted

↳ Accepteur de H^+ $A^- + H^+ \rightarrow AH$
base de Brönsted

2/ ClC_2

$\underset{a}{\underline{Cl}} = \overline{C} - \underline{\overline{Cl}}_{b}$

$N_{v\,mol} = 4\times1 + 7\times2 = 18 \rightarrow$ 9 doublets

$N_I = \frac{1}{2}(6\times3 + 2 - 18) = 1 \rightarrow$ liaison multiple

$\underline{\overline{Cl}} - \overline{C} = \underline{\overline{Cl}}$

$\gamma_F(Cl_a) = 7 - 6 = +1$

$\gamma_F(Cl_b) = 7 - 7 = 0$

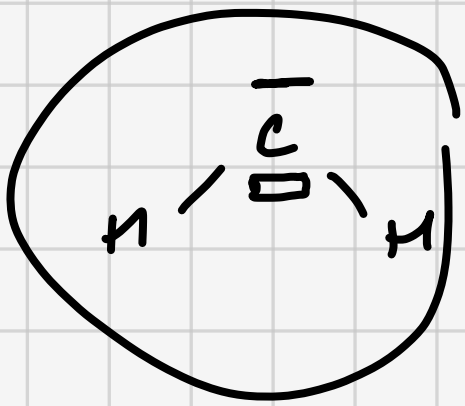
$\gamma_F(C) = 4 - 5 = -1$

3/ CH_2 : $N_{e^-mol} = 4\times1 + 2\times1 \rightarrow 6e^-$

2, 3 doublets

$$N_I = \frac{1}{2}(6\times1 + 2 - 6) = 1$$

$H - \overline{C} - H$ $\Longrightarrow$ AX_2E, coudé



CH_2 est un meilleur acide de Lewis.