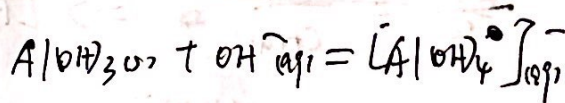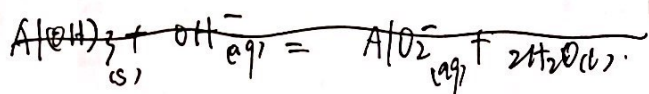1. La espèce amphotère acido-basique peut react avec H^+ et OH^-

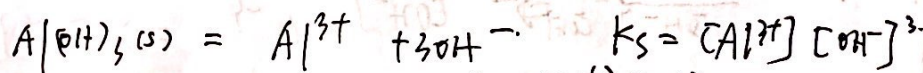$$Al(OH)_{3(s)} + 3H^+_{(aq)} = Al^{3+}_{(aq)} + 3H_2O_{(l)}$$

$$Al(OH)_{3(s)} + OH^-_{(aq)} = AlO_2^-_{(aq)} + 2H_2O_{(l)}$$

$$Al(OH)_{3(s)} + OH^-_{(aq)} = AlO_2^-_{(aq)} + 2H_2O_{(l)}$$

$$Al(OH)_{3(s)} + OH^-_{(aq)} = [Al(OH)_4]^-_{(aq)}$$
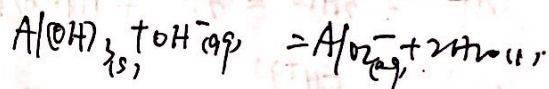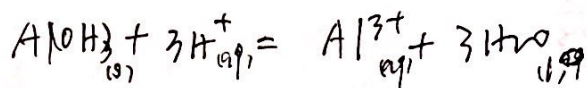
2.
1. Al^{3+}
2. ~~AlS~~ $Al(OH)_3$
3. $[Al(OH)_4]^-$
4. Al

3. L'équation.
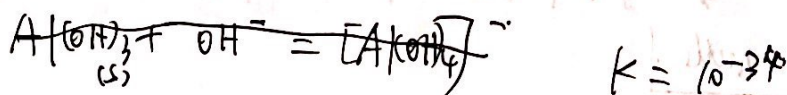
$$Al(OH)_{3(s)} = Al^{3+} + 3OH^- \qquad K_s = [Al^{3+}][OH^-]^3$$

$$Ke = 10^{-14} = [H^+][OH^-]$$

À point A $\quad pH = 4 \implies [H^+] = 10^{-4}\ mol/L \implies [OH^-] = 10^{-10}\ mol/L$

$$Al(OH)_3 + 3H^+ = Al^{3+} + 3H_2O \qquad \frac{K_s}{Ke^3} = \frac{[Al^{3+}]}{[H^+]^3} = \frac{C_{UA}}{[H^+]^3}$$

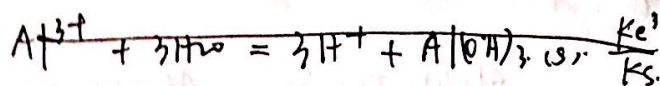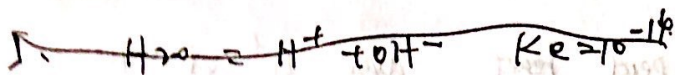donc $[Al^{3+}] = 10^{-2}\ mol/L.$ $\qquad \boxed{K_s = 10^{-32}}$

4.
$$Al(OH)_{3(s)} + OH^- = [Al(OH)_4]^- \qquad K = 10^{-34}$$

$$Al^{3+} + 4OH^- = [Al(OH)_4^-]$$

$$Al(OH)_3 + OH^- = Al(OH)_4^-$$
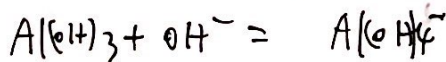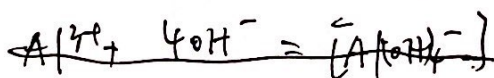
5.
$$pH = 10^{34} \implies K = 10^{-34} = \frac{[Al(OH)_4^-]}{[OH^-]} \qquad H_2O = OH^- + H^+ \quad Ke = 10^{-14}$$

$$pH = 10^{34} \implies K = 10^{-34} = \frac{[Al(OH)_4^-]}{[OH^-]} = \frac{C_{UA}}{[OH^-]}$$

donc $[OH^-]$ $\qquad pH = 10^{34} \implies K = 10^{-34}.$

4. $H_2O = H^+ + OH^-$ $\quad K_e = 10^{-14}$

$Al^{3+} + 3H_2O = 3H^+ + Al(OH)_3 \,(s), \quad \dfrac{K_e^3}{K_s}$

$\dfrac{K_e^3}{K_s} = \dfrac{[H^+]^3}{C_{tra.}} \quad \Longrightarrow \quad [H^+] =$

5. $K_s = 10^{-32} = \dfrac{[Al^{}(OH)_4]}{[OH^-]}$

5. $H_2O = H^+ + OH^- \quad K_e = 10^{-14}$

$Al^{3+} + 3H_2O = 3H^+ + Al(OH)_3 \,(s), \quad \dfrac{K_e^3}{K_s}$

$K_s = 10^{-32}$.

$Al(OH)_3 \,_s + OH^- = [Al(OH)_4^-]$
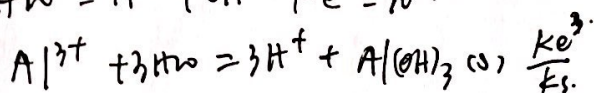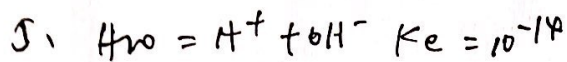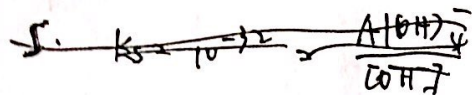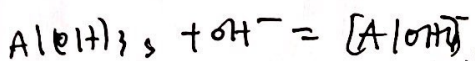
$K = K_s\,\beta(4) = 10^2 = \dfrac{[Al(OH)_4^-]}{[OH^-]} = \dfrac{C_{tra}}{C_{OH}} \Longrightarrow [OH^-] = n^{-4} \Longrightarrow [H^+] = 10^{-10}$

$\boxed{pH = 10}$

6. pour 1/4

$Al^{3+} + 3e^- = Al \,(s).$
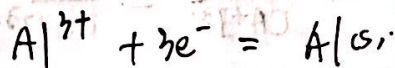
$E = E^\circ(Al^{3+}/Al) + \dfrac{0.06}{3}\log([Al^{3+}]) \qquad \text{pas de } pH.$

$\underline{\text{c'est pente nulle.}}$

pour 2/4.

$Al(OH)_3 + 3e^- + 3H^+ = Al_{(s)} + 3H_2O$
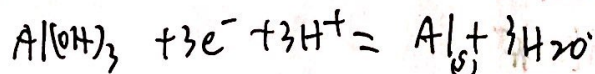
$E = E^\circ(Al(OH)_3/Al) + \dfrac{0.06}{3}\log([H^+]^3) = E^\circ + 0.06\log([H^+]) = E^\circ - 0.06\,pH.$

$\underline{\text{pente} = -0.06}$

2.

pour 3/4.

$$Al(OH)_4^- + 3e^- + 4H^+ = Al(s) + 4H_2O$$
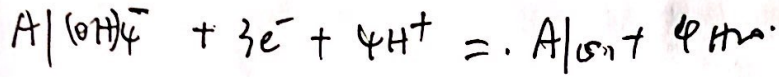
$$E = E^°(Al(OH)_4^-/Al) + \frac{0.06}{4}\log\left(\frac{[H^+]^4}{(Al(OH)_4^-)}\right) = E^° + \frac{4}{3} \times 0.06\log([H^+])$$

$$= E^° - 0.08\,pH.$$

$$\boxed{pente = -0.08}$$

7.

on broye le mineral pour faire la réaction plus vite et complète.

8. ~~C'est toujours et la~~ la rouille est Fe_2O_3.

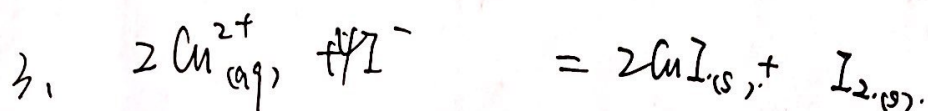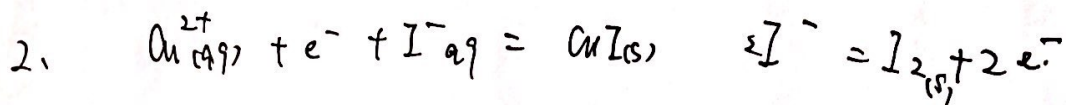Dans le filtrat il y a $[Al(OH)_4]^-$ $NaOH$. H_2O.

9.

2、

2.1 Il n'y a pas de reaction entre Cu^{2+} et I^-.

parce que $E°(Cu^{2+}/Cu^+) = 0.17V$ moins que $E°(I_2/I^-) = 0.62 V$

2. $Cu^{2+}_{(aq)} + e^- + I^-_{aq} = CuI_{(s)}$ $2I^- = I_{2(s)} + 2e^-$

3. $2Cu^{2+}_{(aq)} + 4I^- = 2CuI_{(s)} + I_{2(s)}$

4. $K = \dfrac{1}{[I^-]^4 [Cu^{2+}]^2}$

2.2

6. $[I^-] = 2 \times 10^{-1}$ mol/L.

   $n_{I^-} = 2 \times 10^{-1} \times 50 \times 10^{-3}$ mol $= 1 \times 10^{-2}$ mol $= 2\, n_{Cu^{2+}}$

   $n_{Cu^{2+}} = 5 \times 10^{-3}$ mol. $[Cu^{2+}] = \dfrac{n_{Cu^{2+}}}{20 \times 10^{-3} L} = 0.25$ mol/L.

7.