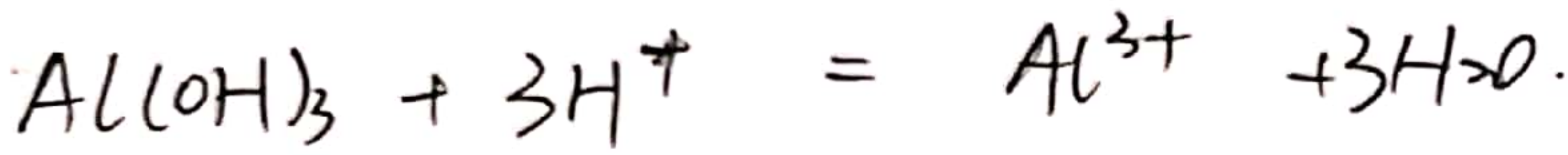


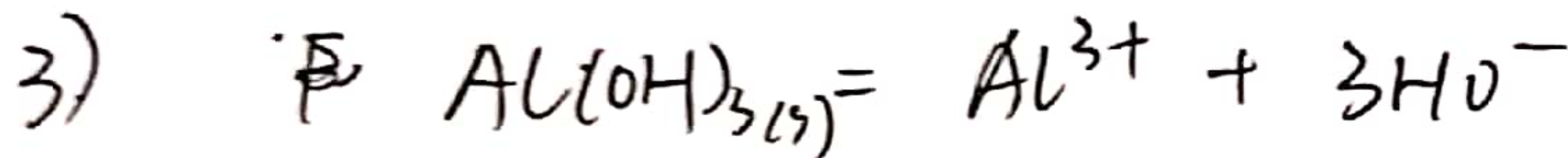
1.) Traitement de la bauxite

Or la définition d'une espèce amphotère acido-basique :

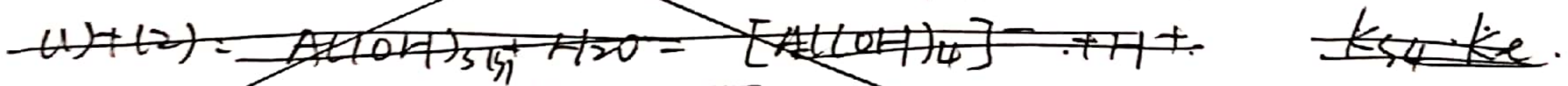
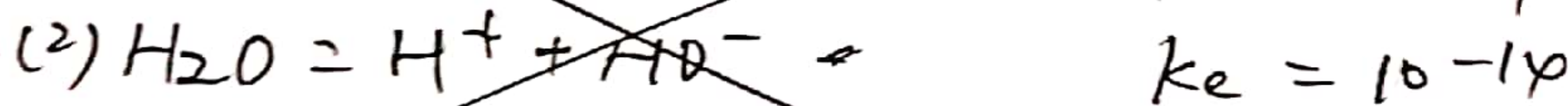
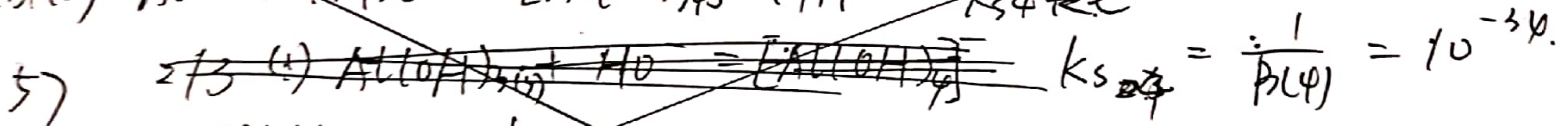
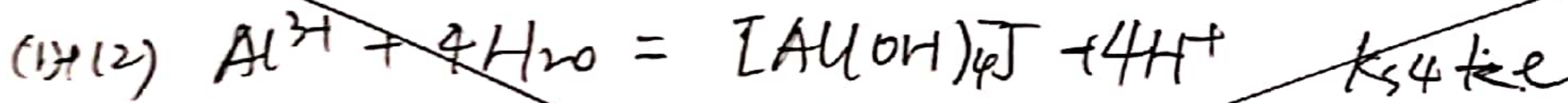
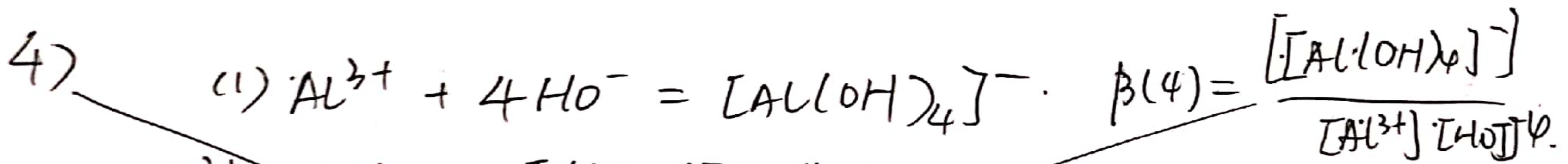
une espèce capable de se comporter comme un acide et comme une base.



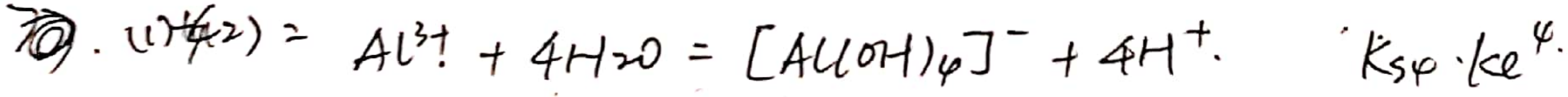
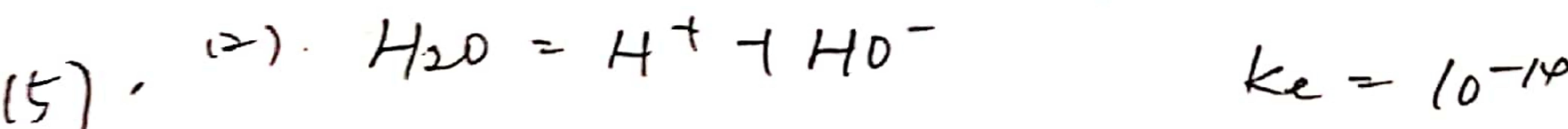
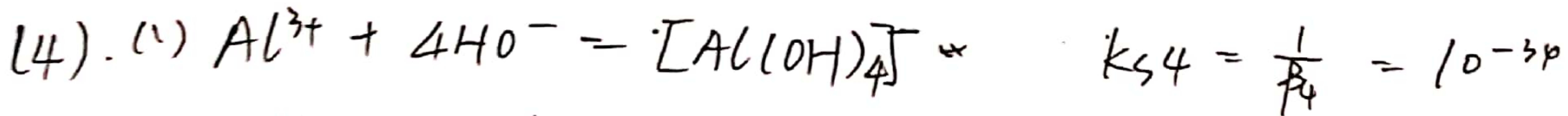
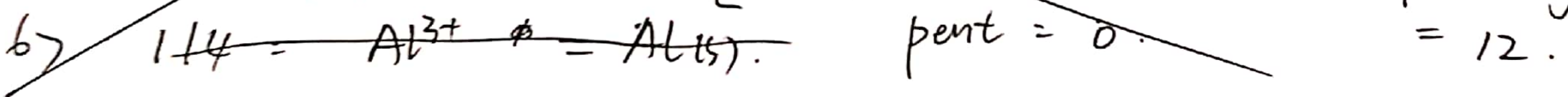
- 2)
1.  $\text{Al}^{3+}$ .
  2.  ~~$\text{Al}(\text{OH})_3$~~   $\text{Al}(\text{OH})_3$
  3.  ~~$\text{Al}(\text{OH})_3$~~   $\text{Al}(\text{OH})_4^-$ .
  4.  $\text{Al}(\text{s})$ .



$$K_s = [\text{Al}^{3+}] [\text{HO}^-]^3$$



$\therefore K_{s4} \cdot K_e = [\text{H}^+]^4 [\text{Al}(\text{OH})_4^-] = [\text{H}^+] \cdot 10^{-2} \therefore \text{pH} = -\log(\text{H}^+) = 12$

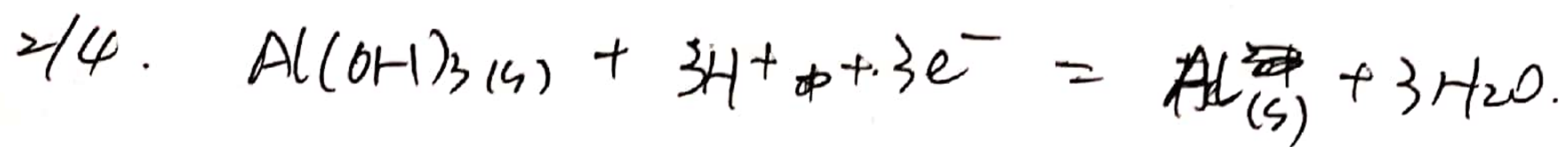


$\Rightarrow K_{s4} \cdot K_e^4 = \frac{[\text{Al}(\text{OH})_4^-] \cdot [\text{H}^+]^4}{[\text{Al}^{3+}]}$

$\text{pH} = -\log(\text{H}^+) =$



(6).  $1/4 \cdot \text{Al}^{3+} + 3e^- = \text{Al}_{(s)}$   $\rightarrow$  pente = 0.  $E = E^\circ(\text{Al}^{3+}/\text{Al}_{(s)}) + 0.06 \log \frac{1}{[\text{Al}^{3+}]} = C_1 \cdot 2/4$



$E = E^\circ(\text{Al}(\text{OH})_3/\text{Al}_{(s)}) + 0.06 \log \left( \frac{[\text{H}^+]}{[\text{Al}(\text{OH})_3]} \right)$

$3/4 \cdot [\text{Al}(\text{OH})_4]^- + 4\text{H}^+ + 3e^- = \text{Al}_{(s)} + 4\text{H}_2\text{O}$   $= C_2 - 0.06 \text{ pH}$   $\Rightarrow$  pente = 0.06.

$E = E^\circ([\text{Al}(\text{OH})_4]^-/\text{Al}) + 0.06 \log \left( \frac{[\text{H}^+]}{[\text{Al}(\text{OH})_4^-]} \right)$

$= C_3 - 0.12 \text{ pH}$   $\text{pente} = 0.12$

(7).

(8)

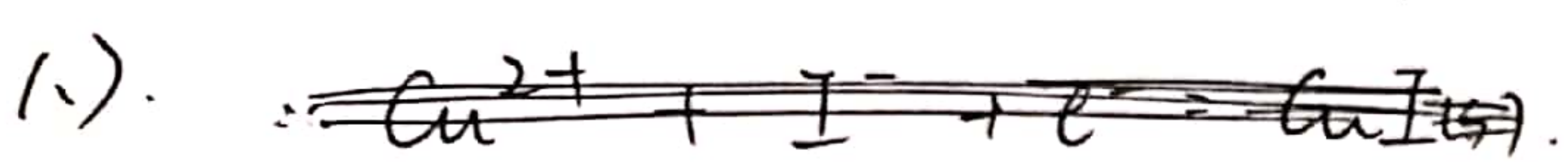
(9)

(10).



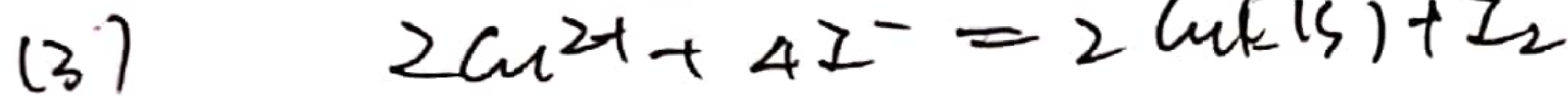
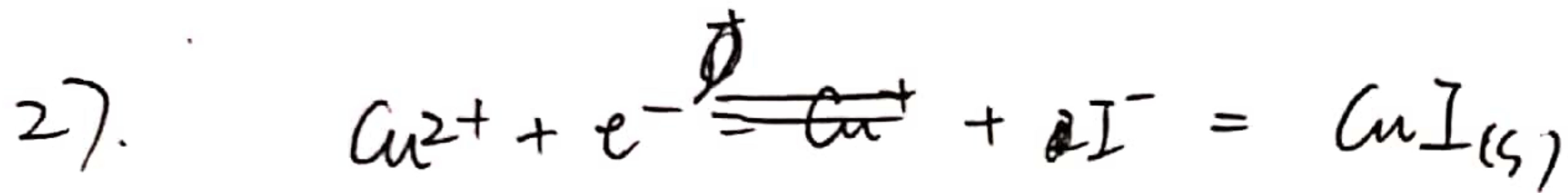
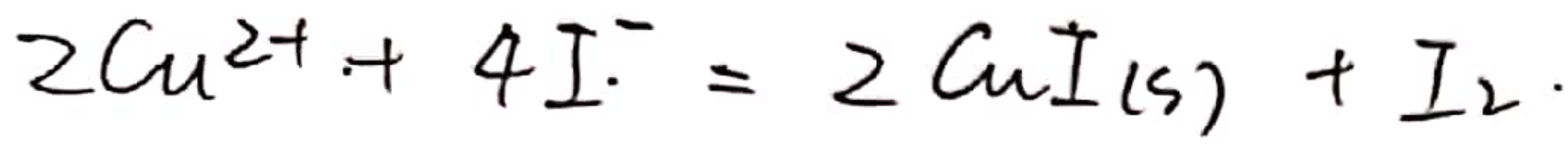
## 2. Titration des ions cuivreux en solution.

2-1.  $\because E^\circ(\text{Cu}^{2+}/\text{CuI}) = 0.89\text{V} > E^\circ(\text{I}_2/\text{I}^-) = 0.62\text{V}$



potentiels redox standard :

$$E_s = E^\circ(\text{Cu}^{2+}/\text{CuI}) - E^\circ(\text{I}_2/\text{I}^-) = 0.89 - 0.62 = 0.27\text{V}.$$

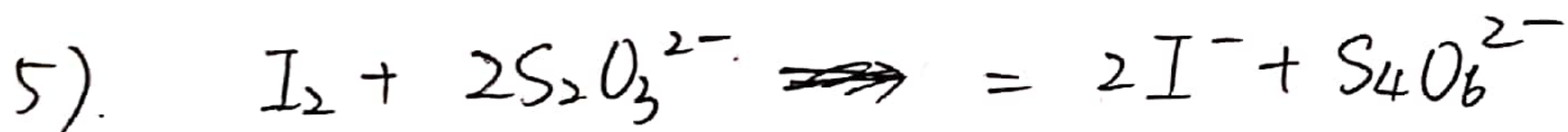


3.) Équation de NERNST

(4)  $E_{eq} = E^\circ(\text{Cu}^{2+}/\text{CuI}) + 0.06 \log ([\text{Cu}^{2+}][\text{I}^-])$

$$E_{eq} = E^\circ(\text{I}_2/\text{I}^-) + 0.06 \log \left( \frac{[\text{I}_2]^{1/2}}{[\text{I}^-]} \right)$$

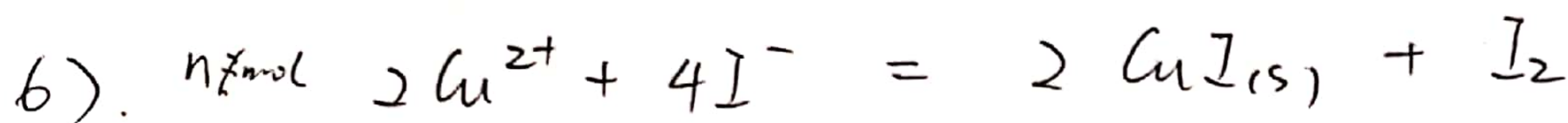
4)  $\Rightarrow k = 10^{4.5} \gg 1.$



$$\because E^\circ(\text{I}_2/\text{I}^-) - E^\circ(\text{S}_4\text{O}_6^{2-}/\text{S}_2\text{O}_3^{2-}) = 0.62 - 0.08 = 0.54\text{V} > 0$$

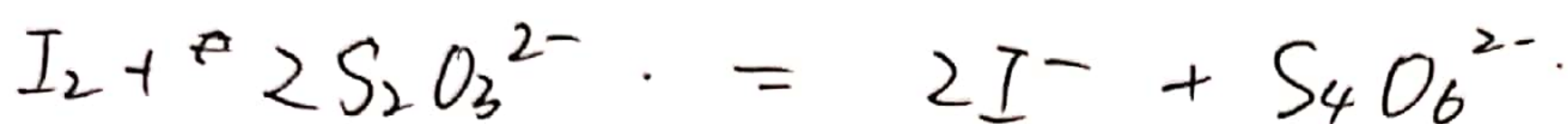
donc. cette réaction peut être considérée comme totale.





$$E_i \quad 20 \times V \quad 50,0 \times 2,0 \times 10^{-1} \quad 0 \quad 0.$$

$$E_f \quad 20V - 2X \quad 10 \text{ mmol} - 4X \quad 2X \quad X$$



$$E_i \quad X \quad 18 \times 1,00 \times 10^{-1} \quad 0 \quad 0$$

$$E_f \quad 0 \quad 0 \quad 2X \quad X$$

$$\therefore X = 18 \times 1,00 \times 10^{-1} = 1,8 \text{ mmol.}$$

$$\therefore n[\text{I}_2] = 1,8 \text{ mmol}$$

$$\therefore n[\text{CuI}_{(s)}] = 3,6 \text{ mmol}$$

$$\therefore \text{CuI}_{(s)} \quad K_s = 10^{-12} = [\text{Cu}^{2+}][\text{I}^-]^2$$

$$\therefore \text{Cu}^{2+} \xrightarrow{\text{totalment}} \text{CuI}$$

$$\text{alors } n[\text{Cu}^{2+}] = n[\text{CuI}] = 3,6 \text{ mmol.}$$

$$\therefore C[\text{Cu}^{2+}] = \frac{n}{V} = \frac{3,6}{20} = 1,8 \times 10^{-1} \text{ mol/L.}$$

$$7) \quad \text{ON peut calculer } V_{\text{nécessaire}}[\text{I}^-] = V_n[\text{I}^-].$$

$$\frac{C[\text{Cu}^{2+}] \cdot V[\text{Cu}^{2+}]}{2} = \frac{C[\text{I}^-] \cdot V_n[\text{I}^-]}{4}$$

$$\Rightarrow V_n[\text{I}^-] = 36 \text{ mL} < 50 \text{ mL.}$$

" le système est bien en excès d'ions iodure.

8).