

北京化工大学

2019-2020-2 学期期末考试答卷

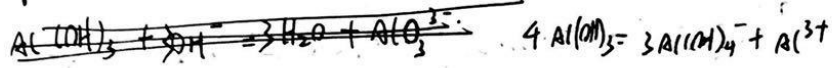
课程名称: ____无机化学 2____ 课程代码: ____CHE11200T____ 任课教师 ____Roisine____

姓名: ____万常睿(Hugo)____ 学号: ____2018110003____ 班级: ____工程 1801____

答卷共 ____3____ 页 第 ____1____ 页

答卷内容 (注: 写清题号, 只写答案)

1. (1) une réaction acido-basique est une d'échange d'un proton entre, l'acide d'un couple acide-base 1 et la base d'un second couple acide-base 2. $A_1H + A_2 = A_1 + A_2H$.



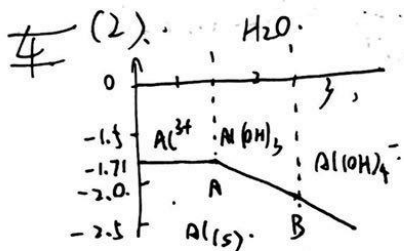
2. ~~pour 1, 2. ce sont des domaines de prédominance.~~

~~pour 3, 4. ce sont des domaines d'existence,~~

3. ~~$K_s(Al(OH)_3) \text{ à } 25^\circ C = 3 \times 10^{-34}$~~

~~Parce que $K_s(A_1A_2) = [A_1]^a [A_2]^b$~~

~~donc $K_s(Al(OH)_3) = 3 \times 10^{-34}$~~



point 1: Al^{3+}

point 2: $Al(OH)_3$

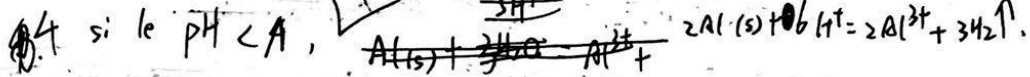
point 3: $Al(OH)_4^-$

point 4: $Al(s)$

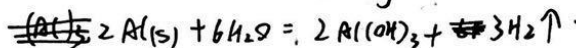
(3) $K_s(Al(OH)_3) = 3 \times 10^{-34}$

$$K_s(Al(OH)_3) = [Al^{3+}] \cdot [OH^-]^3 = 3 \times 10^{-34}$$

Al est oxydé en ions Al^{3+} .

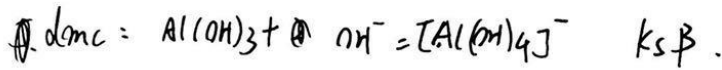
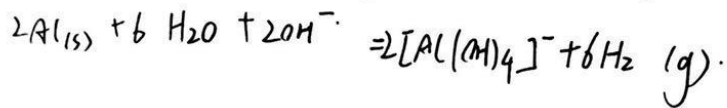


si $A < pH < B$, il est oxydé en $Al(OH)_3$.



si: $\text{pH} > \text{pH}_s$, il est oxydé en $[\text{Al}(\text{OH})_4]^-$.

2/3 Hugo

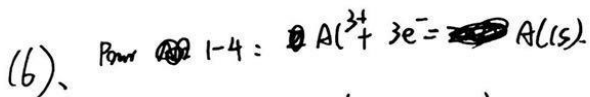


$$K_{sp} K_e = [\text{H}^+][\text{Al}(\text{OH})_4^-] = [\text{H}^+] \text{ctra} = 3 \times 10^{-34} \times 10^{-34} \times 10^{-14} = 3 \times 10^{-14}.$$

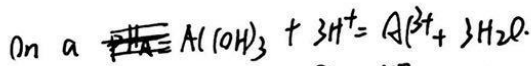
$$(5) \text{ donc } [\text{H}^+] = \frac{3 \times 10^{-34} \times 10^{-34} \times 10^{-14}}{10^{-2}} = 3 \times 10^{-12}.$$

$\Rightarrow \text{pH}_s = 9.5 \Rightarrow$ la valeur de pH limite.

(6) entre 2 et 3 est 9.5.



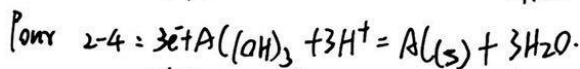
$$E = E^\circ(\text{Al}^{3+}/\text{Al}) + \frac{0.06}{2} \log([\text{Al}^{3+}]) = E^\circ(\text{Al}^{3+}/\text{Al}) + \frac{0.06}{2} \log(\text{ctra}) = -1.76.$$



$$\Rightarrow \frac{K_s}{K_e^3} = \frac{[\text{Al}^{3+}]}{[\text{H}^+]^3} = \frac{\text{ctra}}{[\text{H}^+]^3} \Rightarrow [\text{H}^+]^3 = 0.33 \times 10^{-19}.$$

$$\Rightarrow \text{pH}_A = 4.82.$$

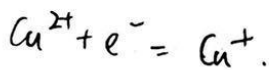
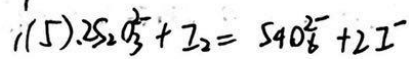
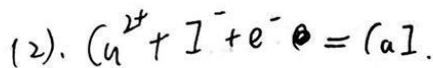
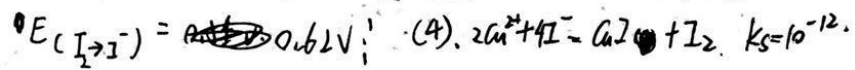
$$\text{donc } K_1 = \frac{\Delta E}{\Delta \text{pH}} = \frac{-1.76 - (-1.71)}{4.82 - 0} = \frac{-0.05}{4.82} = -0.01.$$



$$E = E^\circ(\text{Al}(\text{OH})_3/\text{Al}) + \frac{0.06}{2} \log([\text{H}^+]^3) = E^\circ(\text{Al}(\text{OH})_3/\text{Al}) + 0.09 \text{ pH}$$

$$\Rightarrow K_2 = \frac{\Delta E}{\Delta \text{pH}} = \frac{0.09 \text{ pH}_A}{\text{pH}_B - \text{pH}_A} = \frac{0.09}{4.68} = -0.01.$$

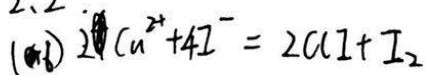
2.
(2.1).



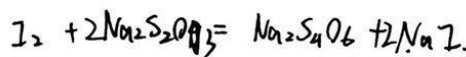
elle est totale

(3). C'est une réaction. prinsistante.

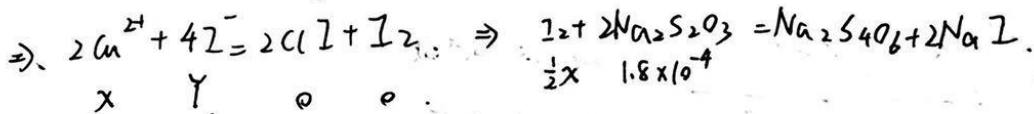
2.2



$$m_{Na_2S_2O_3} = 1 \times 10^{-1} \text{ mol/L} \times 1,8 \times 10^{-3} \text{ L}$$



$$= 1,8 \times 10^{-4} \text{ mol}$$



$$0 \quad Y - 2X = X \cdot \frac{1}{2}X.$$

donc $1.8 \times 10^{-4} \text{ mol} - 2 \times \frac{1}{2} x = 0 \rightarrow x = 1.8 \times 10^{-4} \text{ mol} = 1.8 \text{ } (\mu\text{mol})$.

$$\text{dmc} \quad C_{\text{Cu}^{2+}} = \frac{1.8 \times 10^{-4} \text{ mol}}{20 \text{ mL}} = \frac{1.8 \times 10^{-4} \text{ mol}}{2 \times 10^{-2} \text{ L}} = 9 \times 10^{-3} \text{ mol/L}$$

(7). $n(\text{Ca}^{2+}) = \frac{1,8 \times 10^{-4} \text{ mol}}{2 \times 10^{-2} \text{ mol/L}} = 9 \times 10^{-3} \text{ mol/L}$
 $\gamma = n(\text{Cl}^-) = 5 \times 10^{-2} \text{ L} \times 2 \times 10^{-2} \text{ mol/L} = 1 \times 10^{-2} \text{ mol/L}$

~~Les ions~~ $\Rightarrow Y - 2X > 0$. donc, le système est bien en d'ions iodure

(8). Par couleur et précipitations.