K_{a_1} K_{a_2} K_{a_3}

$K_{a_1} \geq 10^{-8}$

$K_{a_2}C \geq 10^{-8}$

$K_{a_3}C \geq 10^{-8}$

$K_{a_4}C \geq 10^{-8}$

$\frac{K_{a_1}}{K_{a_2}} \geq 10^{4}$

$\frac{K_{a_2}}{K_{a_3}} \geq 10^{4}$

$\frac{K_{a_3}}{K_{a_4}} \geq 10^{4}$

$pH \Rightarrow V = 0 \quad (H_3O^+) = \sqrt{K_{a_1} \cdot c}$

$c_a \geq (H_3O^+)$

$K_{a_1} = 10^{-1,27}$

$pH = \frac{1}{2}(pK_{a_1} + pK_{a_{+1}})$

$$pH_{eq1} = \frac{1}{2}(pK_{a1} + pK_{a2})$$

$$pH_{eq2} = \frac{1}{2}(pK_{a2} + pK_{a3})$$

$$pH_{eq3} \rightarrow A^{3-} + H_2O \rightleftharpoons HA^{2-} + OH^-$$

$$(H_3O^+) = \sqrt{\frac{K_{a3} K_w}{C_s^*}}$$

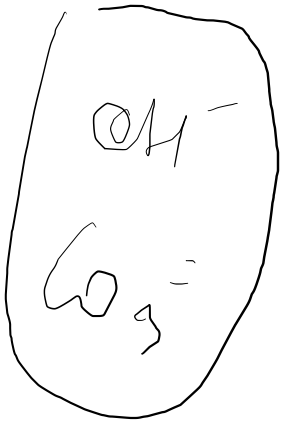
$$2OH^- + H_2CO_3 \rightleftharpoons CO_3^{=} + 2H_2O$$

$$\left.\begin{matrix} OH^- \\ CO_3^{2-} \end{matrix}\right\} + Lh \longrightarrow$$

$$\times\ OH^- + HA \rightleftharpoons H_2O + A^-$$

$$\bullet\ CO_3^{=} + HA \rightleftharpoons HCO_3^- + A^- \quad \infty$$

$$HCO_3^- + HA \rightleftharpoons H_2CO_3 + A^- \quad \text{✶✶}$$



pH ~ 8 → Phénol. pers.

pH ~ 4 → Alc. totale

$$OH^- + H_2CO_3 \rightleftharpoons H_2O + CO_3^{2-}$$

0,1 mol

0,1 mol − x

$\frac{x}{2}$ mol.

H^+

0,1 mol + $\frac{x}{2}$ → → 0,1 mol − $\frac{x}{2}$

0,1 − x + $\frac{x}{2}$ → 0,1 mol