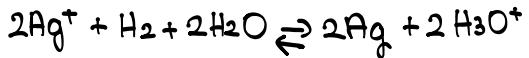
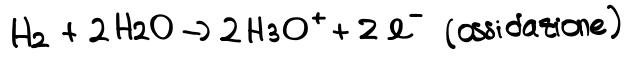


$$\varphi_{\text{em1}} = 0,724 - (-0,036) = 0,76 \text{ V}$$



$$K_{\text{eq}} = 10^{\frac{n \Delta E^\circ}{0,0592}} = 10^{\frac{2(0,80-0)}{0,0592}} = 10^{2+} \gg \phi$$

eq  $\longrightarrow$  (spostato verso i prodotti)

$$q = it \Rightarrow nF = it = n = \frac{it}{F} = \frac{0,15 \cdot 10800}{96500} = 0,0168 \text{ moli e}^- \text{ eieolate}$$

in 0,5 litri

$$\text{moli e}^- \text{ eieolate in 1 litro} = 0,0336$$

$$E_{\text{Ag}^+/\text{Ag}} = 0,8 + 0,0592 \log \underbrace{[\text{Ag}^+]}_{\substack{\text{si consumano} \\ (\text{Ag}^+)_{\text{o}} - (\text{Ag}^+)_{\text{consumati}}}} = 0,631$$

$$\frac{0,25 \cdot 0,0336}{0,0336} = 0,0336$$

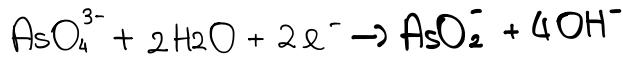
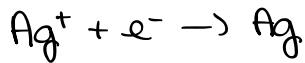
$$E_{\text{H}_3\text{O}^+/\text{H}_2} = 0,0592 \log \underbrace{[\text{H}_3\text{O}^+]}_{\substack{[\text{H}_3\text{O}^+]_{\text{o}} + [\text{H}_3\text{O}^+]_{\text{parziali}} \\ 0,25 \quad [\text{Ag}^+]_{\text{consumati}} \\ 0,0336}} = -0,0323$$

$$\varphi_{\text{em2}} = 0,631 - (-0,0323) = 0,663 \text{ V}$$

$$\Delta \varphi_{\text{em}} = 0,76 - 0,663 = 0,098 \text{ V}$$

**ESERCIZIO:**

Ag	$\text{AgNO}_3$	$\text{AsO}_4^{3-}$ 0,1M	Pt	$i = 50 \text{ mA} = 0,05 \text{ A}$
+	0,1 M	$\text{AsO}_4^{3-}$ 0,5M		$t = 10 \text{ ore} = 36000 \text{ sec}$
		$\text{pH} = 10$ soluzione tamponata	-	<ul style="list-style-type: none"> <li><math>f_{\text{em1}}</math> (prima dell'erogazione)?</li> <li><math>f_{\text{em2}}</math> (dopo l'erogazione)?</li> </ul>

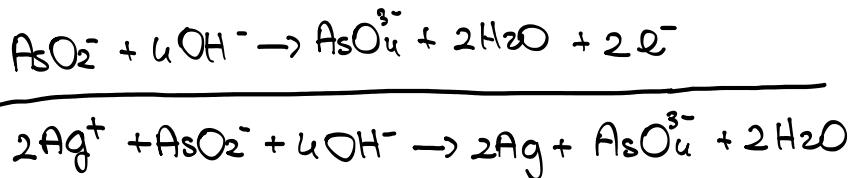
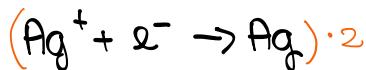


$$\text{pH} = 10 \rightarrow \text{pOH} = 14 - 10 = 4 \Rightarrow [\text{OH}^-] = 10^{-4} \text{ M}$$

$$E_{\text{Ag}^+/\text{Ag}} = \underbrace{E_{\text{Ag}^+/\text{Ag}}^\circ}_{0,80} + 0,0592 \log \underbrace{[\text{Ag}^+]}_{0,1} = 0,74 \text{ V} \oplus$$

$$E_{\text{AsO}_4^{3-}/\text{AsO}_4^-} = \underbrace{E_{\text{AsO}_4^{3-}/\text{AsO}_4^-}^\circ}_{-0,71} + \frac{0,0592}{2} \log \underbrace{\frac{[\text{AsO}_4^{3-}]}{[\text{AsO}_4^-][\text{OH}^-]^4}}_{0,5 \quad 10^{-4}} = -0,257 \text{ V} \ominus$$

$$f_{\text{em1}} = 0,74 - (-0,257) = 0,997 \text{ V}$$



$$q = it \Rightarrow nF = it \Rightarrow n = \frac{i \cdot t}{F} = \frac{0,05 \cdot 36000}{96500} = 0,0186 \text{ moli e}^- \text{ erogate}$$

$$\begin{aligned} [\text{Ag}^+]_2 &= [\text{Ag}^+]_0 - \underbrace{[\text{Ag}^+]_{\text{consumati}}}_{\substack{\downarrow \\ \text{si consumano}}} \text{ per 1 Ag}^+ \text{ che si consuma} \\ &\quad \text{serve 1 mole di elettroni} \\ &\quad \text{moli di} \\ &\quad \text{elettroni} = 0,0186 \end{aligned}$$

$$[\text{Ag}^+]_2 = 0,1 - 0,0186 = 0,0814 \text{ M}$$

$$\begin{aligned} [\text{AsO}_4^{3-}]_2 &= [\text{AsO}_4^{3-}]_0 + \underbrace{[\text{AsO}_4^{3-}]_{\text{formati}}}_{\substack{\downarrow \\ \text{si formano}}} \text{ da 2 Ag}^+ \text{ che si consumano} \\ &\quad \text{si formano 1 di AsO}_4^{3-} \\ &\quad \frac{1}{2} [\text{Ag}^+]_{\text{consumati}} = 0,0093 \end{aligned}$$

si formano

$$\frac{1}{2} [\text{Ag}^+]_{\text{consumati}} = 0,0093$$

$$[\text{AsO}_4^{3-}]_2 = 0,1 + 0,0093 = 0,109 \text{ M}$$

$$[\text{AsO}_4^{3-}]_2 = [\text{AsO}_4^{3-}]_0 - [\text{AsO}_4^{3-}]_{\text{consumati}} = 0,5 - 0,0093 = 0,491 \text{ M}$$

↓  
si consumano  
per 2  $\text{Ag}^+$  che si  
consumano si  
consuma 1 di  $\text{AsO}_4^{3-}$

$$[\text{OH}^-]_2 = 10^{-4} \text{ M}$$

Soluzione tampone  $\rightarrow$  il pH non cambia  $\rightarrow$  Non cambia la concentrazione degli  $[\text{OH}^-]$

$$E_{\text{Ag}^+/\text{Ag}} = 0,80 + 0,0592 \log(0,0184) = 0,735 \text{ V}$$

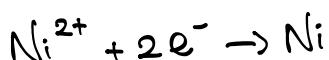
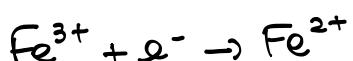
$$E_{\text{AsO}_4^{3-}/\text{AsO}_4^{2-}} = -0,71 + \frac{0,0592}{2} \log \left( \frac{0,109}{0,49 \cdot (10^{-4})^2} \right) = -0,256 \text{ V}$$

$$\text{fem} = 0,735 - (-0,256) = 0,991 \text{ V}$$

ESERCIZIO:

Pt	$\left  \begin{array}{l} \text{Fe}^{3+} 0,25 \text{ M} \\ \text{Fe}^{2+} 0,15 \text{ M} \end{array} \right $	$\left  \begin{array}{l} \text{Ni}^{2+} \\ 0,40 \text{ M} \end{array} \right $	Ni	$\cdot \text{fem?}$
+			-	$\cdot [\text{Fe}^{3+}]_{\text{eq?}}$ (a pila scarica)

semireazioni:



$$E_{\text{Fe}^{3+}/\text{Fe}^{2+}} = E_{\text{Fe}^{3+}/\text{Fe}^{2+}}^{\circ} + 0,0592 \log \frac{[\text{Fe}^{3+}]}{[\text{Fe}^{2+}]} = 0,780 \text{ V} \oplus$$

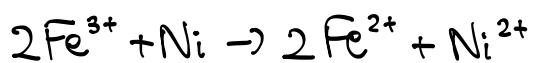
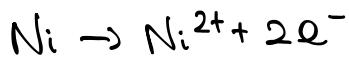
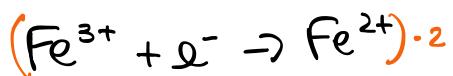
$$E_{\text{Fe}^{3+}/\text{Fe}^{2+}} = \underbrace{E^{\circ}_{\text{Fe}^{3+}/\text{Fe}^{2+}}}_{0,771} + 0,0592 \log \frac{[\text{Fe}^{3+}]}{[\text{Fe}^{2+}]} = 0,784 \text{ V} \oplus$$

0,15

$$E_{\text{Ni}^{2+}/\text{Ni}} = \underbrace{E^{\circ}_{\text{Ni}^{2+}/\text{Ni}}}_{-0,257} + \frac{0,0592}{2} \log \frac{[\text{Ni}^{2+}]}{[\text{Ni}]} = -0,27 \text{ V} \ominus$$

0,40

$$\Delta E = 0,784 - (-0,27) = 1,054 \text{ V}$$



$$K_{\text{eq}} = 10^{\frac{n \Delta E^{\circ}}{0,0592}} = 10^{\frac{2(0,771 + 0,257)}{0,0592}} = 10^{37} \gg 0$$

eq  $\rightarrow$  (sostato verso i prodotti)

$\Rightarrow \text{Fe}^{3+}$  si consumano quasi completamente  $\Rightarrow \text{Fe}^{3+} \approx \emptyset$

$$[\text{Fe}^{2+}] = [\text{Fe}^{2+}]_0 + \underbrace{[\text{Fe}^{2+}]_{\text{formati}}}_{\substack{\parallel \\ 0,15}} = 0,15 + 0,25 = 0,40 \text{ M}$$

da  $2\text{Fe}^{3+}$  che si consumano  
si formano 2 di  $\text{Fe}^{2+}$

$$[\text{Fe}^{3+}]_0 = 0,25$$

$$[\text{Ni}^{2+}]_{\text{eq}} = [\text{Ni}^{2+}]_0 + \underbrace{[\text{Ni}^{2+}]_{\text{formati}}}_{\substack{\parallel \\ 0,40}} = 0,40 + 0,125 = 0,525 \text{ M}$$

da  $2\text{Fe}^{3+}$  che si consumano  
si forma 1 di  $\text{Ni}^{2+}$

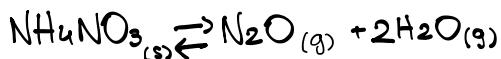
$$[\text{Fe}^{3+}] \cdot \frac{1}{2} = 0,125$$

$$K_{\text{eq}} = \frac{[\text{Fe}^{2+}]_{\text{eq}}^2 [\text{Ni}^{2+}]_{\text{eq}}}{[\text{Fe}^{3+}]_{\text{eq}}^2} \Rightarrow [\text{Fe}^{3+}]_{\text{eq}}^2 = \frac{[\text{Fe}^{2+}]_{\text{eq}}^2 \cdot [\text{Ni}^{2+}]_{\text{eq}}}{K_{\text{eq}}} = \frac{(0,40)^2 \cdot 0,525}{10^{37}} =$$

$$\Rightarrow [\text{Fe}^{3+}] = 9,16 \cdot 10^{-20} \text{ M}$$

### ESERCIZIO:

Una quantità di 19,2 gr di  $\text{NH}_4\text{NO}_3(s)$  (nitrato di ammonio solido) viene inserito all'interno di un contenitore dal volume di 10 litri inizialmente vuoto e la temperatura viene portata a 500 K, si verifica la seguente reazione:



Si misura una pressione totale all'equilibrio pari a 1,48 atm. Calcolare il grado di dissociazione di  $\text{NH}_4\text{NO}_3$ , la  $K_p$ , il grado di dissociazione di  $\text{NH}_4\text{NO}_3$  e la Pressione totale se il volume viene portato a 22 litri alla stessa temperatura.

Dati: $\left\{ \begin{array}{l} 19,2 \text{ gr di } \text{NH}_4\text{NO}_3 \\ T = 500 \text{ K} \\ P_{T(\text{eq})} = 1,48 \text{ atm} \\ V = 10 \text{ l} \end{array} \right.$	$\begin{cases} \textcircled{1} \left\{ \begin{array}{l} \alpha(\text{NH}_4\text{NO}_3) ? \\ K_p ? \end{array} \right. & V = 10 \text{ l} \\ \textcircled{2} \left\{ \begin{array}{l} \alpha'(\text{NH}_4\text{NO}_3) ? \\ P_{\text{tot}}' ? \end{array} \right. & T = 500 \text{ K} \end{cases}$
---	--

$\text{NH}_4\text{NO}_3(s) \rightleftharpoons \text{N}_2\text{O}_{(g)} + 2\text{H}_2\text{O}_{(g)}$				$\Rightarrow$ equilibrio ETERGENEO
inizio	0,24	-	-	$\downarrow$ il numero di molie varia
eq.	$0,24 - x$	$x$	$2x$	$\text{mol}_\text{tot} = 3x$ <u>Sono solo quelle gassose</u>

$$19,2 \text{ gr } \text{NH}_4\text{NO}_3 \Rightarrow \frac{19,2}{\text{PM}(\text{NH}_4\text{NO}_3)} = 0,24 \text{ mol di } \text{NH}_4\text{NO}_3$$

$\frac{11}{80}$

$$n = \frac{PV}{RT} = \frac{1,48 \text{ atm} \cdot 10}{0,001 \cdot 500} = 0,36$$

$$\eta_T = \frac{PV}{RT} = \frac{1,48 \text{ atm} \cdot 10}{0,082 \cdot 500} = 0,36$$

$$3x = 0,36 \Rightarrow x = 0,12$$

$$\alpha(\text{NH}_4\text{NO}_3) = \frac{\text{moli dissociate}}{\text{moli iniziali}} = \frac{x}{0,24} = \frac{0,12}{0,24} = 0,5 \Rightarrow 50\%$$

$$K_p = \frac{P_{\text{N}_2\text{O}} \cdot P_{\text{H}_2\text{O}}^2}{-} = X_{\text{N}_2\text{O}} \cdot P_T \cdot X_{\text{H}_2\text{O}}^2 \cdot P_T^2 = \frac{x}{3x} 1,48 \left( \frac{2x}{3x} 1,48 \right)^2 = 0,48$$

$T = \text{costante} \rightarrow K_p = \text{costante}$

$$0,48 = \left( \frac{n_{\text{N}_2\text{O}} \cdot RT}{V'} \right) \left( \frac{n_{\text{H}_2\text{O}} RT}{V'} \right)^2 = x \cdot 4x^2 \left( \frac{RT}{V'} \right)^3$$

$x = 0,265 \rightarrow \underline{\text{NON va bene}} \text{ perche' } > 0,24 \text{ (moli iniziali)}$

$\Rightarrow$  il solido si dissocia completamente  $\rightarrow$  al max si possono dissociare  $0,24$  moli

$$\alpha'(\text{NH}_4\text{NO}_3) = \frac{0,24}{0,24} = 1 \cdot 100\% \text{ di dissociazione}$$

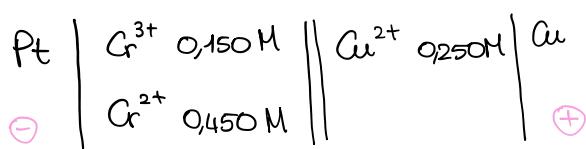
$$\eta_T = \frac{3x}{0,24} = 3 \cdot 0,24 = 0,72$$

$$P' = \frac{n_T RT}{V'} = \frac{0,72 \cdot 0,082 \cdot 500}{22} = 1,36 \text{ atm}$$

# Lezione 22. 15-12-21

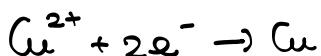
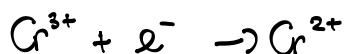
mercoledì 22 dicembre 2021 14:06

ESERCIZIO:



- f<sub>eu</sub>?
- calcolare le concentrazioni delle specie ioniche a pila scartata

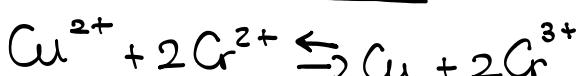
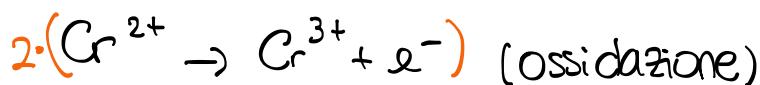
semireazioni di riduzione:



$$E_{\text{Cr}^{3+}/\text{Cr}^{2+}} = \underbrace{E_{\text{Cr}^{3+}/\text{Cr}^{2+}}^{\circ}}_{-0,407} + 0,0592 \log \frac{\overbrace{[\text{Cr}^{3+}]}^{0,150 \text{M}}}{\underbrace{[\text{Cr}^{2+}]}_{0,450}} = -0,435 \text{ V } \ominus$$

$$E_{\text{Cu}^{2+}/\text{Cu}} = \underbrace{E_{\text{Cu}^{2+}/\text{Cu}}^{\circ}}_{0,342} + \frac{0,0592}{2} \log \frac{[\text{Cu}^{2+}]}{0,250} = 0,324 \text{ V } \oplus$$

$$f_{eu} = 0,324 - (-0,435) = 0,759 \text{ V}$$



A pila scartata:

$$K_{eq} = 10^{\frac{n \Delta E^{\circ}}{0,0592}} = 10^{\frac{2(0,342 + 0,407)}{0,0592}} = 2,22 \cdot 10^{25} \gg \phi$$

eq  $\longrightarrow$  (spostato verso i prodotti)  $\Rightarrow \text{Cr}^{2+} \approx \emptyset$

Nella reazione finale abbiamo due ioni quindi per scegliere quale porre uguale circa a zero dobbiamo fare delle valutazioni: Se nella reazione finale abbiamo un rapporto 1/1 allora sveliamo lo ione con concentrazione iniziale minore, se nella reazione fina non abbiamo lo stesso rapporto scegliamo lo ione con coefficiente stechiometrico maggiore.

$$\left[ \text{Cr}^{2+} \right]_0 = 0,450$$

" "

$$\left[ \text{Cr}^{3+} \right] = \left[ \text{Cr}^{3+} \right]_0 + \underbrace{\left[ \text{Cr}^{3+} \right]_{\text{formati}}}_{\text{per } 2\text{Cr}^{2+} \text{ che si consumano}} = 0,150 + 0,450 = 0,600 \text{ M}$$

$\downarrow$

$\text{si formano}$

$\text{per } 2\text{Cr}^{2+} \text{ che si consumano}$

$\text{si formano } 2\text{Cr}^{3+}$

$\text{per } 1\text{Cu}^{2+} \text{ consumato}$   
 $\text{si consumano } 2\text{Cr}^{3+}$

$$\left[ \text{Cu}^{2+} \right] = \left[ \text{Cu}^{2+} \right]_0 - \underbrace{\left[ \text{Cu}^{2+} \right]_{\text{consumati}}}_{\text{per } 1\text{Cu}^{2+} \text{ consumato}} = 0,250 - 0,225 = 0,025 \text{ M}$$

$\downarrow$

$\text{si consumano}$

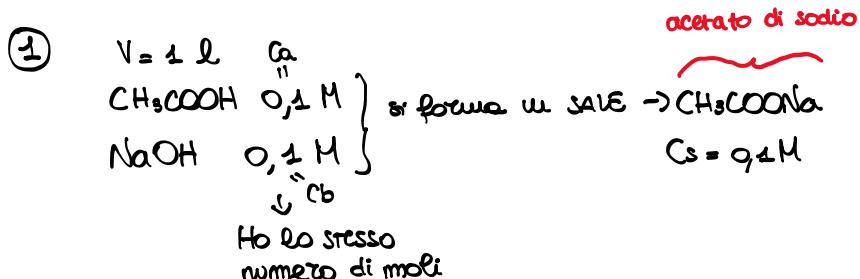
$\frac{\left[ \text{Cr}^{2+} \right]}{2}$

$$K_{\text{eq}} = \frac{\left[ \text{Cr}^{3+} \right]_{\text{eq}}^2}{\left[ \text{Cu}^{2+} \right]_{\text{eq}} \left[ \text{Cr}^{2+} \right]_{\text{eq}}} \Rightarrow \left[ \text{Cr}^{2+} \right]_{\text{eq}}^2 = \sqrt{\frac{(0,600)^2}{0,025 \cdot 2,22 \cdot 10^{-5}}} = 8,05 \cdot 10^{-3} \text{ M}$$

$2,22 \cdot 10^{-5}$

### ESERCIZIO:

In 1 litro di soluzione sono presenti  $\text{CH}_3\text{COOH}$  con concentrazione 0,1 M e  $\text{NaOH}$  con concentrazione 0,1 M.



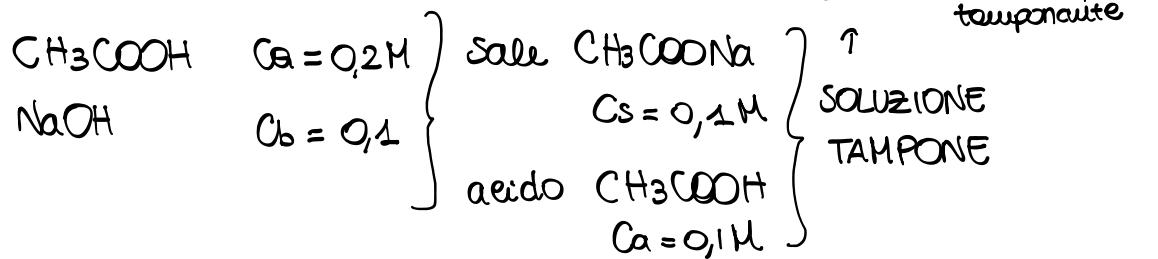
Ho lo stesso  
numero di moli

acido debole + base forte  $\rightarrow$  idrolisi basica

$$[\text{OH}^-] = \sqrt{k_i C_s} = \sqrt{\frac{k_w}{k_a} C_s} = \sqrt{\frac{10^{-14}}{1,8 \cdot 10^{-5}} \cdot 0,1}$$

$$\rho\text{OH} = 5,13 \rightarrow \rho\text{H} = 8,87$$

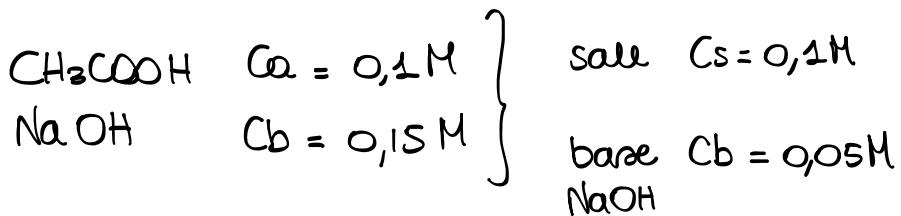
②  $V = 1 \text{ l}$



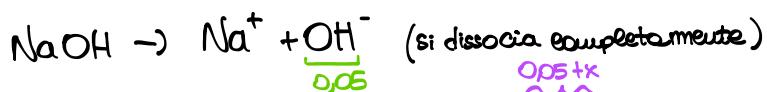
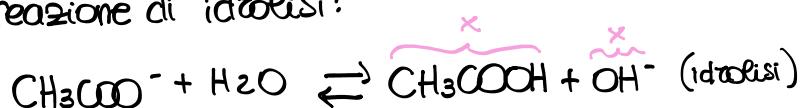
$$[\text{H}_3\text{O}^+] = K_a \frac{C_a}{C_s} = 1,8 \cdot 10^{-5} \frac{0,1}{0,1} = 1,8 \cdot 10^{-5} \text{ M}$$

$$\rho\text{H} = -\log 1,8 \cdot 10^{-5} = 4,74$$

③  $V = 1 \text{ l}$



reazione di idrolisi:



$$K_i = \frac{[\text{CH}_3\text{COOH}][\text{OH}^-]}{[\text{CH}_3\text{COO}^-]} = \frac{[\text{CH}_3\text{COOH}][\text{OH}^-]}{C_s - [\text{CH}_3\text{COOH}]} = \frac{(0,05 + x) \times}{0,1 - x}$$

$$\frac{k_w}{k_a} = \frac{10^{-14}}{1,8 \cdot 10^{-5}}$$

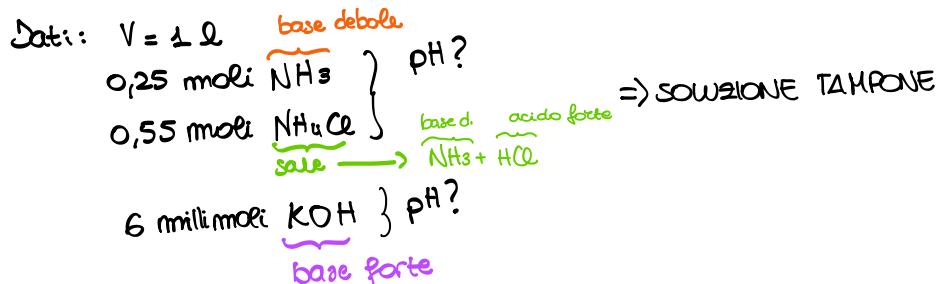
parte che si è dissociata

$$\Rightarrow \frac{10^{-14}}{1,8 \cdot 10^{-5}} = \frac{(0,05 + x) \times}{0,1 - x} \Rightarrow \frac{10^{-14}}{1,8 \cdot 10^{-5}} (0,1 - x) = 0,05x + x^2$$

$$\Rightarrow -\frac{10^{-10}}{1,8} + \underbrace{\frac{x \cdot 10^{-9}}{1,8}}_{0,05} + 0,05x + x^2 = 0 \Rightarrow x = 1,1 \cdot 10^{-9}$$

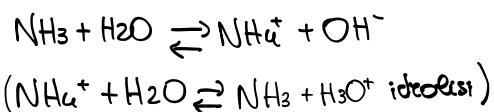
ESERCIZIO:

Abbiamo 1 litro di una soluzione acquosa contenente 0,25 moli di NH<sub>3</sub>, e 0,55 moli di NH<sub>4</sub>Cl. Calcolare il pH di questa soluzione e poi calcolare il pH dopo l'aggiunta di 6 millimoli di KOH.



④ C<sub>b</sub> = 0,25 M  
 C<sub>s</sub> = 0,55 M

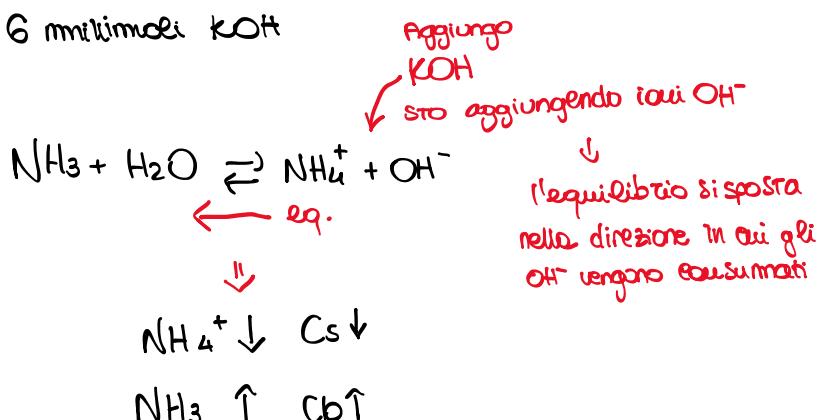
eq. di Henderson - Hasselbalch:



$$[\text{OH}^-] = K_b \frac{C_b}{C_s} = 1,8 \cdot 10^{-5} \frac{0,25}{0,55} = 8,18 \cdot 10^{-6} \text{ M}$$

$$\text{pOH} = 5,087 \rightarrow \text{pH} = 8,913$$

② 6 millimoli KOH



$$[\text{OH}^-] = K_b \frac{C_b + 0,006}{C_s - 0,006} = 1,8 \cdot 10^{-5} \frac{0,25 + 0,006}{0,55 - 0,006} = 8,470 \cdot 10^{-6} \text{ M}$$

$$\text{pOH} = 5,092 \Rightarrow \text{pH} = 8,928$$

ESERCIZIO:

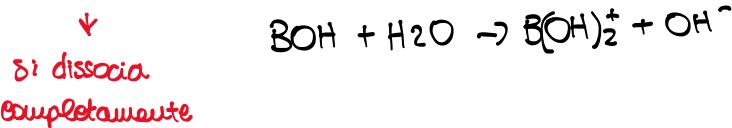
Una soluzione acquosa di una base (BOH generica) ha un volume pari a 1,8 litri e il pH = 11,6 calcolare il volume di acqua che deve essere aggiunto per portare il pH=11,2 nei seguenti casi:

- A) Base forte
- B) Base debole

Dati:  $V_i = 1,8 \text{ l}$  BOH (base)

$$\begin{array}{l} \text{pH}_i = 11,6 \\ \text{pH}_f = 11,2 \end{array} \quad V_{\text{acqua}} ?$$

A) Base forte  $\text{BOH} \rightarrow \text{B}^+ + \text{OH}^-$



$$\text{pH}_i = 11,6 \Rightarrow \text{pOH}_i = 2,4 \Rightarrow [\text{OH}^-]_i = 3,98 \cdot 10^{-3} \text{ M}$$

$[\text{OH}^-]_i = C_b$  (perché base completamente dissociata)

$$\begin{array}{l} \Downarrow \\ C_b = 3,98 \cdot 10^{-3} \text{ M} \end{array}$$

$$\text{pH}_f = 11,2 \Rightarrow \text{pOH}_f = 2,8 \Rightarrow [\text{OH}^-]_f = 1,58 \cdot 10^{-3} \text{ M}$$

$$C_b \cdot V_i = C_b \cdot V_f \Rightarrow 3,98 \cdot 10^{-3} \cdot 1,8 = 1,58 \cdot 10^{-3} \cdot V_f$$

$$\Rightarrow V_f = 4,53 \text{ litri}$$

$$\Delta V = V_f - V_i = 4,53 - 1,8 = 2,73 \text{ l} \quad (\text{Volume di H}_2\text{O aggiunto})$$

B) base debole  $V_i = 1,8 \text{ l}$

$$\text{pH}_i = 11,6, \text{ pH}_f = 11,2$$



$$\text{pOH}_i = 2,4 \Rightarrow [\text{OH}^-]_i = 3,98 \cdot 10^{-3} \text{ M}$$

$$\rho\text{OH}_f = 2,8 \Rightarrow [\text{OH}^-] = 1,58 \cdot 10^{-3} \text{ M}$$

$$\frac{\text{Cbi}_i \text{V}_i}{?} = \frac{\text{Cbf}_f \text{V}_f}{?} \quad (\text{sto doppio per seccato})$$

↓

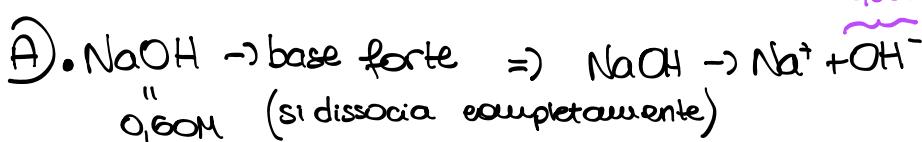
$$\frac{[\text{OH}^-]^2_i}{k_b} \text{V}_i = \frac{[\text{OH}^-]^2_f}{k_b} \text{V}_f \Rightarrow \text{V}_f = 11,39 \text{ l}$$

$$\Delta V = \text{V}_f - \text{V}_i = 11,39 - 1,8 = 9,59 \text{ l} \quad (\text{V}_{\text{H}_2\text{O}} \text{ aggiunto})$$

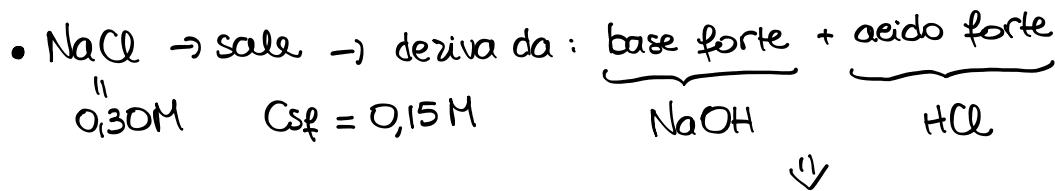
ESERCIZIO:

Calcolare IL PH delle seguenti soluzioni ottenuta ciascuna mescolando volumi uguali di due diverse soluzioni

- A)  $0,60 \text{ M NaOH} + 0,30 \text{ M NaCl}$   $\underbrace{\text{base forte}}$   $\underbrace{\text{sale}}$   $V_1 = V_2 = V$
- B)  $0,60 \text{ M NaOH} + \text{H}_2\text{O}$
- C)  $0,60 \text{ M NaOH} + 0,70 \text{ M KOH}$   $\underbrace{\text{base forte}}$
- D)  $0,60 \text{ M NaOH} + 0,40 \text{ M NaNO}_3$   $\underbrace{\text{Sale (nitrato di sodio)}}$



$$\text{V}_f = 2V \rightarrow \text{Cbf} = 0,30 \text{ M}$$



NON DA' IDROLISI

$\Rightarrow$  il pH dipenderà solo dalla base forte:

$$[\text{OH}^-] = 0,30 \text{ M} \rightarrow \rho\text{OH} = 0,52 \rightarrow \rho\text{H} = 13,48$$



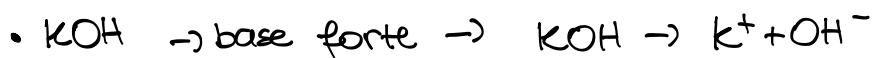
"  
0,60

$$V_f = 2V \quad C_{bf} = 0,30\text{M}$$

$$[\text{OH}^-] = 0,30\text{M} \rightarrow \rho\text{OH} = 0,52 \rightarrow \rho\text{H} = 13,48$$



"  
0,60M  $C_{bf} = 0,30\text{M}$



"  
0,70  $C_{bf} = 0,35$

$$[\text{OH}^-]_T = 0,30 + 0,35 = 0,65$$

$$\rho\text{OH} = -\log 0,65 = 0,18 \quad \rho\text{H} = 14 - 0,18 = 13,81$$



"  
0,60M  $C_{bf} = 0,30\text{M}$



"  
0,40M

$\Downarrow$

$$C_s = 0,20\text{M}$$

Non dà idrolisi

$$[\text{OH}^-] = 0,30\text{M} \rightarrow \rho\text{OH} = 0,52 \rightarrow \rho\text{H} = 13,48$$