

Azido-Base eta Erredox - Emaitzak

Ariketa #1

Erreakzio-taula:

	$\text{NH}_3 + \text{H}_2\text{O} \rightleftharpoons \text{NH}_4^+ + \text{OH}^-$			
c has	0,025	-	-	
c ald	$-0,025 \alpha$	$0,025 \alpha$	$0,025 \alpha$	
c orek	$0,025 (1-\alpha)$	$0,025 \alpha$	$0,025 \alpha$	

a) Disoziazio-gradua

Oreka-konstantea erabiliz:

$$K_b = 1,8 \cdot 10^{-5} = \frac{[\text{NH}_4^+][\text{OH}^-]}{[\text{NH}_3]} = 0,025 \frac{\alpha^2}{1-\alpha} \xrightarrow[1-\alpha=1]{\text{hurbilketa}}$$

$$\alpha = \sqrt{\frac{1,8 \cdot 10^{-5}}{0,025}} = 0,0268 \rightarrow \text{Hurbilketa zuzena} \rightarrow \alpha = \% 2.68$$

b) Ioi hidroxidoen mol-kopurua

$$n(\text{OH}^-) = [\text{OH}^-] \cdot V = (0,025 \alpha) \cdot 0,1 \text{ L}$$

$$n(\text{OH}^-) = 6,7 \cdot 10^{-5} \text{ mol OH}^-$$

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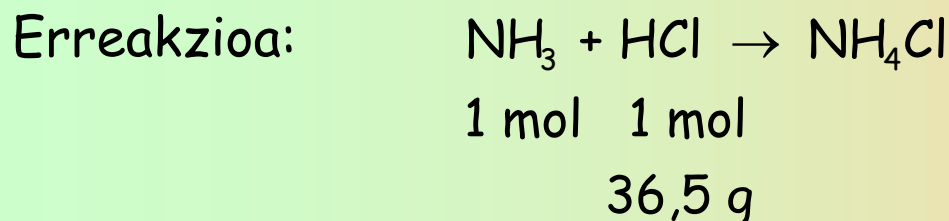
c) pH

Aurrena pOH kalkulatuko dugu eta gero pH:

$$pOH = -\log(0,025 \alpha) = 3,17$$

$$pH = 14 - pOH = 10,83$$

d) HCl-ren bolumena



$$Mm(\text{HCl}) = 1 + 35,5 = 36,5 \text{ g/mol}$$

Amoniakoaren mol-kopurua:

$$n(\text{NH}_3) = 0,025 \frac{\text{mol}}{\text{L}} * 0,1 \text{ L} = 2,5 * 10^{-3} \text{ mol NH}_3$$

HCl-ren bolumena:

$$V(\text{HCl}) = 2,5 * 10^{-3} \text{ mol NH}_3 * \frac{1 \text{ mol HCl}}{1 \text{ mol NH}_3} * \frac{36,5 \text{ g HCl}}{1 \text{ mol HCl}} * \frac{1 \text{ L}}{25 \text{ g HCl}} = 3,65 * 10^{-3} \text{ L}$$

$$V = 3,65 \text{ mL HCl solution}$$

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Ariketa #2

a) Molaritatea

Kontzentrazioa unitate batetik bestera aldatuko dugu:

$$Mm(\text{HNO}_3) = 1 + 14 + (3 \cdot 16) = 63 \text{ g/mol}$$

$$[\text{HNO}_3] = \frac{40 \text{ g HNO}_3}{100 \text{ g sol}} * \frac{1250 \text{ g sol}}{1 \text{ L sol}} * \frac{1 \text{ mol}}{63 \text{ g HNO}_3} = 7,94 \text{ M}$$

b) pH

Azidoa sendoa da eta guztiz disoziatuta dago:

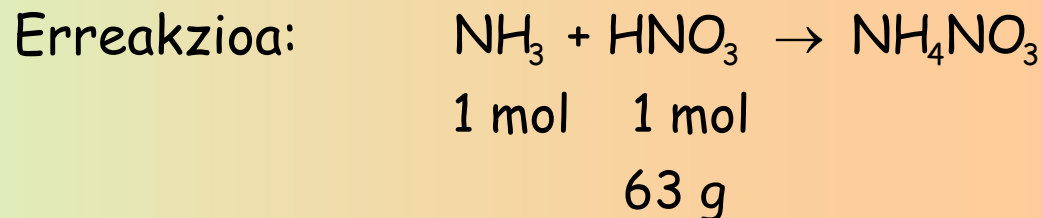
$$\text{pH} = -\log(7,94) = -0,9$$

Kontzentrazioa oso handia da eta pH negatiboa da.

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Ariketa #2

c) Amoniakoaren kontzentrazioa

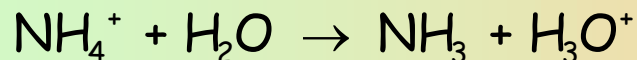
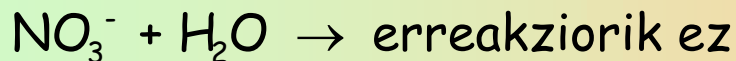


NH_3 -ren kontzentrazioa:

$$n(\text{NH}_3) = 0,028 \text{ L HNO}_3 * \frac{7,94 \text{ mol HNO}_3}{1 \text{ L}} * \frac{1 \text{ mol NH}_3}{1 \text{ mol HNO}_3} = 0,222 \text{ mol NH}_3$$

$$[\text{NH}_3] = \frac{0,222 \text{ mol NH}_3}{0,125 \text{ L}} = 1,78 \text{ M}$$

d) pH pH-a hidrolisiaren araberakoa da:

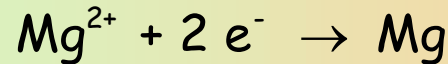


pH-a 7 baino txikiagoa izango da.

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Ariketa #3

a) Masa Elektroli mol batek 96500 C ditu.
Magnesioaren erredukzioa:



Pasatzen den karga 3.5 egunetan:

$$q = 6,20 \frac{\text{C}}{\text{s}} * 3,5 \text{ egun} * \frac{24 \text{ h}}{1 \text{ egun}} * \frac{3600 \text{ s}}{1 \text{ hh}} = 1\ 874\ 880 \text{ C}$$

Sortuko den Mg masa:

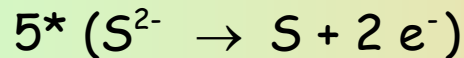
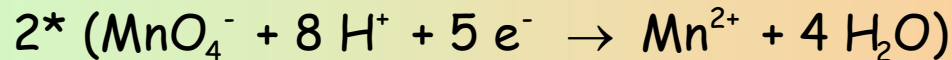
$$m = 1\ 874\ 880 \text{ C} * \frac{1 \text{ mol } e^{-}}{96\ 500 \text{ C}} * \frac{1 \text{ mol Mg}}{2 \text{ mol } e^{-}} * \frac{24 \text{ g Mg}}{1 \text{ mol Mg}} = 233,15 \text{ g Mg}$$

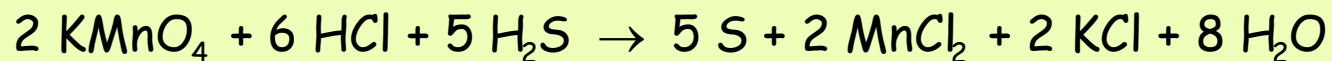
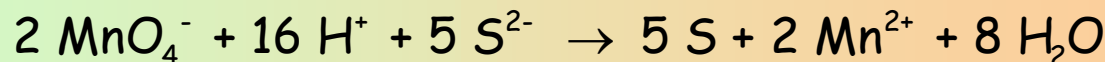
b) Denbora minututan

$$t = 10 \text{ g Mg} * \frac{1 \text{ mol Mg}}{24 \text{ g Mg}} * \frac{2 \text{ mol } e^{-}}{1 \text{ mol Mg}} * \frac{96\ 500 \text{ C}}{1 \text{ mol } e^{-}} * \frac{1 \text{ s}}{4,5 \text{ C}} * \frac{1 \text{ min}}{60 \text{ s}} = 297,8 \text{ min}$$

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Ariketa #4





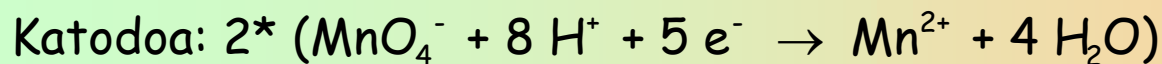
a) Doiketa

b) Espeziak

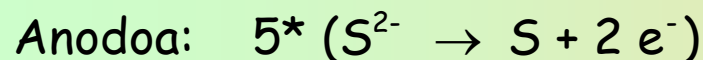
Oxidatzailea: MnO_4^- Erreduzitua: Mn^{2+}

Erreduktorea: S^{2-} Oxidatua: S

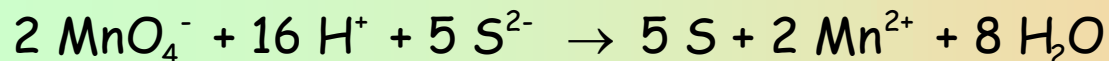
c) d) Pila voltaikoa



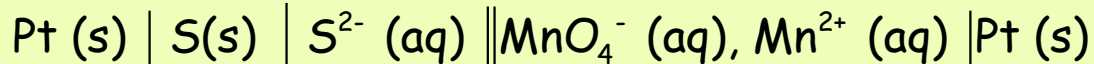
$$E^0 = 1,51 \text{ V}$$



$$E^0 = -0,14 \text{ V}$$



$$E_{\text{pila}}^0 = 1,37 \text{ V}$$



Ariketa #5

a) Euri azido naturala

CO_2 gasak sortzen du. Azido ahula da eta $\text{pH} = 5,6$ -koa du.

b) Gas emisioak

Nitrogenoaren (NO_x) eta sufreakaren oxidoak (SO_x) sortzen dute euri azidoa.

c) Efektuak

Izaki bizidunak hiltzen ditu (pH azido) eta ioi metaliko astunak liberatzen ditu.

d) Prebentzioa

Bihurgailu katalitikoak (NO_x eliminatzen du) eta sufre gutxiko erregaiak.