Moath Dweik

تلخيص لاب
الكيمياء العامة (1)

1) $Density = \frac{Mass}{Volume} \approx \frac{g}{mL/L/cm^3}$

2) * Mass of water lost upon heating
= Mass of alum – Mass of unhydras

→ $Moles = \frac{Mass}{Molar\ Mass}$

* → percentage of water of crystalizing by Mass

= Mass of lost upon heating X100 %

→ value of "X" = $\frac{\text{※ moles of water}}{\text{※ moles of anhydrate salt}}$

$\frac{(\text{Mass of alum} - \text{Mass of water})}{\text{MM of unhydrays}}$

$\frac{(\text{Mass of alum} - \text{Mass of anhydrays})}{\text{MM of water}}$

A)

3) ex: ?P + ?O → $P_?O_?$ ← اول خطوة

Mass of white oxide ($P_?O_?$) − Mass of (P) = Mass of (O_2)

→ $\frac{Mass}{MM}$ = moles of O_2 and P

empirical formela → $P_{n_1}O_{n_2}$

division by smalest number of moles

→ mass percent of "X" in XO (oxide)

$= \frac{mass\ X}{mass\ XO} \times 100\%$ ⇒ experimently X_1

~~→ percent error~~

Mass percent of Mg in MgO (calculated)

$= \frac{\text{Molar Mass of Mg}}{\text{Molar Mass of MgO}} \times 100\%$ X_2

~~Mass~~

→ percentege error $= \frac{|X_2 - X_1|}{X_2} \times 100\%$

*① $Mg_3N_2 + 6H_2O \rightarrow 3Mg(OH)_2 + 2NH_3$ (→ amonia)

② $3Mg(OH)_2$ + heat → $MgO + H_2O$

4) * $2Na_3PO_4 + 3BaCl_2 \rightarrow Ba_3(PO_4)_2(s) + 6NaCl$

Soudium phosphate — barium cloride

* net Ionic equation :-

$$2PO_4^{-3} + 3Ba^{+2} \rightarrow Ba_3(PO_4)_2$$

→ * if we have masses → moles → الأقل هو limiting reactant → نحسب كتلة المترسبة ← نحول ال limiting reactant "moles"

→ moles of product نجيب العامل إلي بحجوه من المعادلة "النسبة" → mass by = n * MM

* Mass of excess = Na...
Mass of salt Mix − (Mass of limiting + Mass of Ba...)

* Mass percentage of limiting = $\frac{\text{Mass of limiting}}{\text{Mass of salt Mix}} \times 100\%$

* test for excess of PO_4^{-3}
we add 2 drop of $BaCl_2$ solution to beaker if precipitate formes then PO_4^{-3} excess Ba limiting

* test for excess $BaCl_2$
نفس الطريقة

5) * $n = M * V(L)$

* $n = \frac{mass}{MM}$

→ Number of moles of base = Number of moles of acid

* the Indicator phenolphthalein, which is colorless in acid and pink in base

* we have volume and we have molirity → moles of base

1:1 → moles of acid → Molirity

moles of acid ×MM → mass

* Mass percent acitic acid in Vinger

$= \frac{\text{~~\# of moles~~ Molinity} \times MM}{10 \times density} \%$

6) * $Mg(OH)_2 + 2HCl \longrightarrow MgCl_2 + 2H_2O$

$Al(OH)_3 + 3HCl \longrightarrow AlCl_3 + 3H_2O$

* $CaCO_3 + 2HCl \longrightarrow CaCl_2 + CO_2 + H_2O$

* $NaHCO_3 + HCl \longrightarrow NaCl + CO_2 + H_2O$

* Mass of antacid sample ---g

HCl: $n_1 = V * M$ → used to dissolve antacid.

NaOH: $n_2 = V * M$ → buret reading; M → same HCl

~~$n_{excess\ HCl} = n_1 - n_2$~~

$n_{excess\ of\ HCl} = n_2$

$n_{nut} = n_1 - n_2$ → needed to nutralize antacid tablet

* Neutralizing capacity of antacid

$= \frac{n_{nut}}{\text{Mass of antacide}}$

7) * $IO_3^- + 8I^- + 6H^+ \rightarrow 3I_3^- + 3H_2O$

→ $IO_3^- : I_3^-$
1 : 3

* $I_3^- + C_6H_8O_6 + H_2O \rightarrow C_6H_8O_7 + 3I^- + 2H^+$
1:1

* $2S_2O_3^{-2}$ + excess $I_3^- \rightarrow 3I^- + S_4O_6^{-2}$
2:1
deep blue — colorless

⊛ mass for sample ......

⊛ add KIO3 (moles of) $\xrightarrow{1:1}$ $K^+ + IO_3^-$ $\xrightarrow{\text{treated with } I^-}$ I_3^- (total)
1:3 (x3)

⊛ *n of $Na_2S_2O_3$ = M * V(L)
M → 1 ; V(L) → buret (F − I)

*n of excess I_3^- ← (÷2) *n of $S_2O_3^{-2}$ (1:1)

⊛ *n of I_3^- (Total − excess) → reduced by $C_6H_8O_6$

Mass of $C_6H_8O_6$ ← x MM *n of $C_6H_8O_6$ ← 1:1

Mass percent → $\frac{\text{mass}}{\text{sample}} \times 100\%$

(I_3^-) red brown → ($S_2O_3^{-2}$) pale yellow → (starch) deep blue → ($S_2O_3^{-2}$) colorless

8) ⊛ $ClO^- + 2S_2O_3^{-2} + 2H^+ \rightarrow Cl^- + S_4O_6^{-2} + H_2O$

1 : 2

⊛ Volume of bleach solution

⊛ Volume of $Na_2S_2O_3$ solution (buret reading (F − I))

× M

* n of ClO^- reduced ← ÷2 (1:2) ← * n of $Na_2S_2O_3$

÷ volume of bleach → Molirity of diluted bleach

* diluted factor → Molirty of original bleach

* Mass percent = $\frac{\text{Molirity original} \times MM}{d \times 10}$

* diluted factor = $\frac{\text{original}}{\text{diluted}}$

a) gases behave ideally : ① low pressure
② High Temp
③ low Mwt

$\longrightarrow PV = nRT$

$\Rightarrow PV = \left(\frac{Mass}{MM}\right) * R * T$

tor ≡ mmHg
÷ 760
atm

P: atm
V: L
Mass: g

T: K°
MM: g/mole

10) Heat lost = Heat gained

$q_{warm water} = [q_{cold water} + q_{cal}]$

for cold water

$(m * S * \Delta t)_{warm water} = [(m S \Delta t)_{cold} + (C * \Delta t)_{cal}]$

cal constant

① ⊛ $NaOH + HCl \longrightarrow NaCl + H_2O$

② ⊛ $NH_3 + HCl \longrightarrow NH_4Cl$

③ ⊛ $NaOH + NH_4Cl \longrightarrow NaCl + NH_3 + H_2O$

Five Apple

A) (q_{hot}) Heat lost by hot water = m * S * Δt
(q_{cold}) " gained " cold " = m * S * Δt
(q_{cal}) Heat gained by cal water = (hot − cold)

(C) constant = $\frac{\text{Heat gained by cal water}}{\Delta T \text{ for cold water}}$

B) (q_{sol}) Heat gained by solution = m * S * Δt
(q_{cal}) " " " cal = C * Δt
Heat of the reaction = −(q_{sol} + q_{cal})

$\Delta H = \frac{\text{Heat of the reaction (kJ)}}{\text{n of water} \approx \text{NaOH} \approx \text{HCl}}$

* V + V = 2V

* m + m = 2m

c) same part (B)

* to determined the third equation enthalpy (ΔH) → NaOH + NH_4Cl → NaCl + NH_3 + H_2O

$\Delta H_{Third} = \Delta H_{(First)} + (-\Delta H_{(Second)})$ "Hess's Law