General Chemistry with Doc M

3/13 Today: Section 16.9 – 16.10 + review stuff

Unit 4

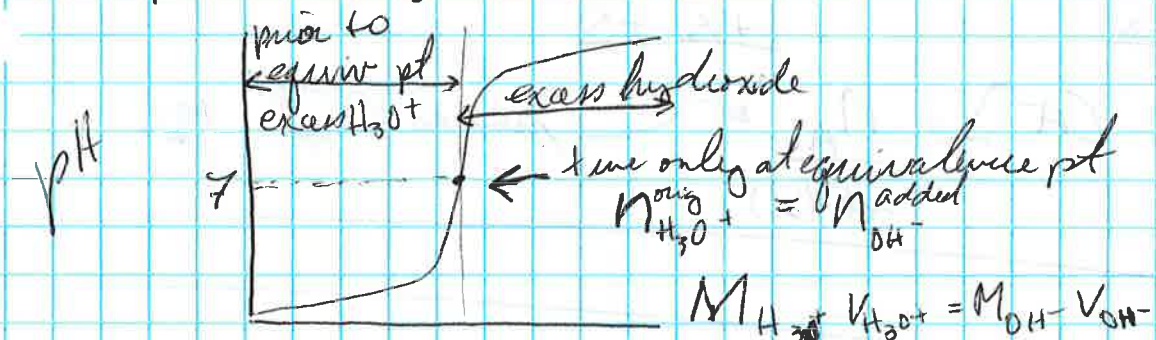
3/15 Wednesday: Finish Chp 16 (Unit 4)

3/16 Thursday: Expt 8 buffers: PHI (recipe 1)
Prelab lecture available
Lab quiz on Expt 7 (H_3PO_4 titration)

3/17 CK3 Pons open 15 min before test
Checklist + old test online

3/20 Monday: Last day to Withdraw

titration $H_3O^+ + OH^-$



always true $n = MV$

at any other place during the titration pH = ?

$n \quad H_3O^+ + OH^- \rightleftharpoons 2H_2O$

I $n = mv \quad n = mv$

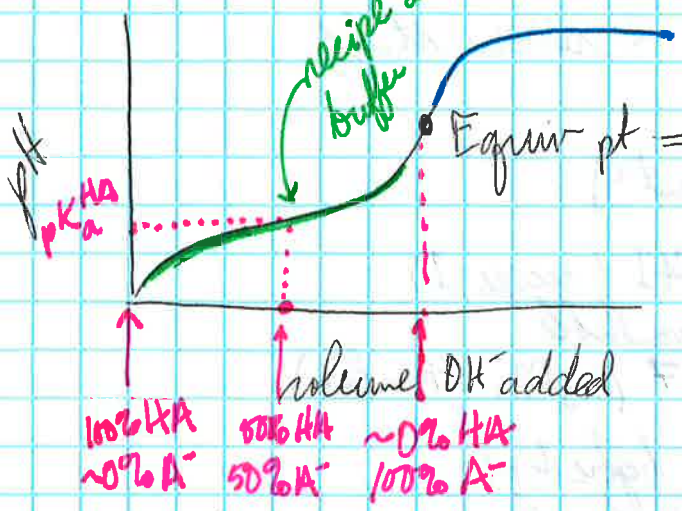
C (one is LR)

F (Other is excess)

Excess $n_{H_3O^+}$ or n_{OH^-}

Titration HA with OH^-

excess OH^- ⇒ same calc as SA + SB titr
n ICE table calc using V_{tot}



Equiv pt ⇒ $\underbrace{n_{HA}^{orig} = n_{OH}^{added}}_{\text{now gone}} = n_{A^-}^{\text{now present}}$

What is pH at eq pt?

	M A^- (wb)	+ H_2O ⇌	OH^-	+ HA	$K_b^{A^-}$
I	?		0	0	
C	−x		+x	+x	
E					

$[A^-] = \dfrac{n_{A^-}}{V_{tot}\ (L)}$ ← same as $n_{HA}^{orig} = M_a V_a$

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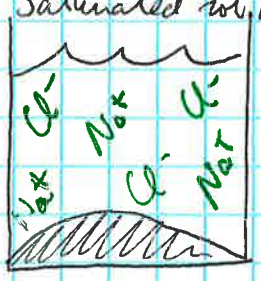
test 4 material

Solubility Equilibria

It is possible to dissolve 35.7 g NaCl in water to make a 100 ml sol'n

Saturated sol'n



	M	$NaCl_{(s)}$ ⇌	$Na^+_{(aq)}$	+ $Cl^-_{(aq)}$
	I	lots	0	0
	C	−x	x	x
	E	lots	x	x

$K_{sp} = [Na^+][Cl^-]$ ↳ solubility product ≡ K_c

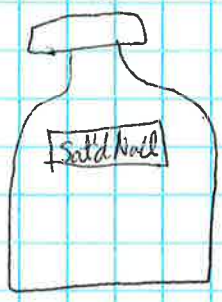
molar solubility (mol/L)

$$[NaCl] = \frac{\text{mol NaCl}}{\text{Vol sol'n}} = \frac{35.7\,g \,\Big|\, 1\,mol \,\Big|}{\Big|\, 58.5\,g \,\Big|\, 0.100\,L} = 6.10$$

All ionics that dissolve, dissociate 100% into ions in sol'n

$$K_{sp} = [Na^+][Cl^-]$$

$$= 6.10 \times 6.10 = 37.2$$



$[NaCl] = 6.10\,M$

$[Na^+] = 6.10\,M$

$[Cl^-] = 6.10\,M$

Solubility Equilibria

	$PbI_2(s)$	$\rightleftharpoons$	Pb^{2+}	$+ 2I^-$
I	lots		0	0
C	$-x$		x	$2x$
E	lots		x	$2x$

$$K_{sp} = [Pb^{2+}][I^-]^2 = 8.5 \times 10^{-9}$$

$$x(2x)^2 = K_{sp} = 8.5 \times 10^{-9}$$

$$2x^3 = 8.5 \times 10^{-9}\,M$$

$$x = 1.29 \times 10^{-3}\,M$$

x = molar solubility $= 1.29 \times 10^{-3}\,M$