

Sept. 19: Chapter 4 sections 1-3

Sept. 21: Sections 4.4-4.9

Sept. 23: Problem club with Ali HL-359 7-8:30

Sept. 24: Review day

5. sample mass = 0.5224g
C₁H₁Cl
- 0.33476g C ← $\times MM_C$
- 0.0234g H ← $\times MM_H$
0.16472g Cl

$n_{CO_2} = 1.2267g CO_2 \div MM_{CO_2} = 0.027883 mol CO_2 = 0.027873 mol C$
 $n_{H_2O} = 0.2093g H_2O \div MM_{H_2O} = 0.011617 mol H_2O = 0.023235 mol H$
 $n_{Cl} = 0.16472g Cl \div MM_{Cl} = 0.004646 mol Cl$

divide by smallest #

C	5.999	=> 6
H	5.000	
Cl	1	

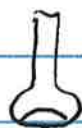
} C₆H₅Cl MM = 112.45g/mol

Molarity

$$\text{Molarity} = \frac{n_{\text{solute}}}{V_{\text{sol'n}}} \quad \leftarrow V \text{ has to be in liters}$$

$$M = \frac{n}{V}$$

step 1



32.0g NaCl

step 2



fill with water

$$n_{\text{solute}} = \frac{32.0g NaCl}{58.44g NaCl} \times \frac{mol NaCl}{1} = 0.548 mol$$

$$V_{\text{sol'n}} = 250.00 mL = 0.250 L$$

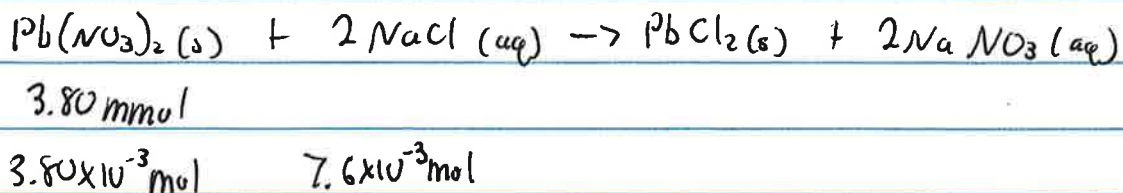
$$M = \frac{0.548 mol}{0.25 L} = 2.19 \frac{mol NaCl}{L}$$

How many moles of NaCl are in 45.0 mL of 2.19 M NaCl?

$$n = MV$$

$$n = \frac{2.19 \text{ mol NaCl}}{\text{L sol'n}} \times 0.045 \text{ L sol'n} = 0.09855 \text{ mol NaCl}$$

What volume of 2.19 M NaCl(aq) is needed to react completely with 3.80 mmol Pb(NO₃)₂(s)?

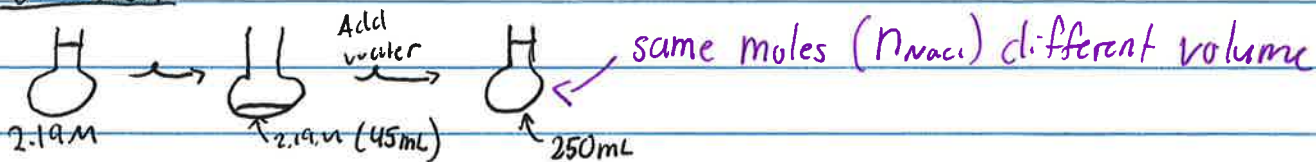


$$\frac{3.80 \times 10^{-3} \text{ mol Pb(NO}_3)_2}{1 \text{ mol Pb(NO}_3)_2} \times \frac{2 \text{ mol NaCl}}{1 \text{ mol Pb(NO}_3)_2} = 7.6 \times 10^{-3} \text{ mol NaCl}$$

$$M = \frac{n}{V} \Rightarrow V = \frac{n}{M}$$

$$V = \frac{7.60 \times 10^{-3} \text{ mol NaCl}}{2.19 \text{ mol NaCl}} \times \text{L sol'n} = \boxed{3.47 \times 10^{-3} \text{ L}} = 3.47 \text{ mL}$$

dilutions



$$n_{\text{conc}} = n_{\text{dil}}$$

$$\boxed{M_{\text{conc}} V_{\text{conc}} = M_{\text{dil}} V_{\text{dil}}}$$

$$(2.19 \text{ M})(45 \text{ mL}) = M_{\text{dil}} (250 \text{ mL}) \quad \text{OR} \quad (2.19 \text{ M})(0.045 \text{ L}) = M_{\text{dil}} (0.25 \text{ L})$$

$$\boxed{M_{\text{dil}} = 0.3942 \text{ M NaCl}}$$

$$M_{\text{dil}} = 0.3942 \text{ M NaCl}$$

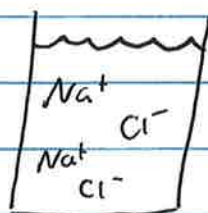
$[NaCl] = 0.394 M = M_{NaCl} = 0.394 M$
"molarity of NaCl"

Ionic substances in water

• Those that are soluble

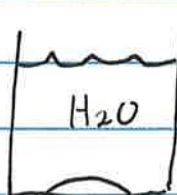
$NaCl$ $Cr(NO_3)_3$
 NH_4BrO_3
 $P(CH_3)_4$ $C_2H_3O_2$

"All ionics that dissolve dissociate 100% into ions"



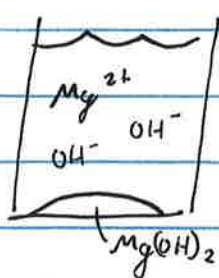
electrolytes
↑ can conduct electricity

• Those that don't dissolve are



generally
non-electrolytes
(no ions)

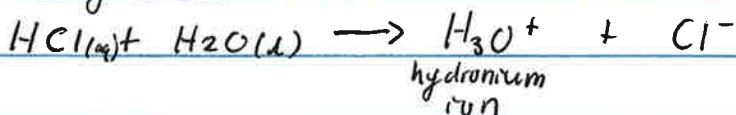
• Some ionics dissolve a bit (weak electrolytes)



← just a few
IONS

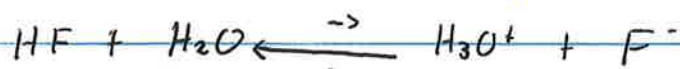
acids

strong acids - dissociate 100% in water into ions



HBr , HI , HNO_3 , $HClO_4$, H_2SO_4

weak acids - weak electrolytes



↑ doesn't dissociate
much