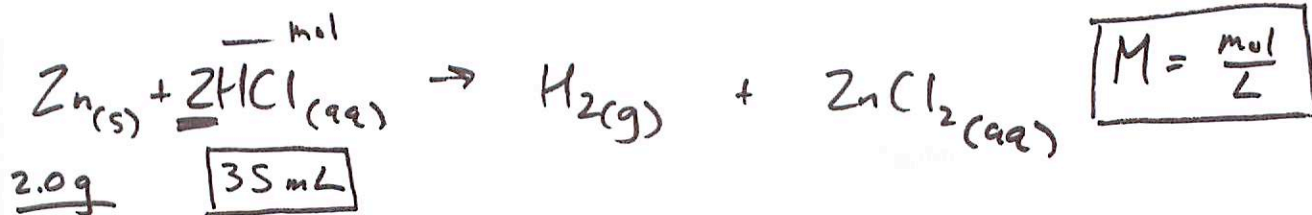


## Day 2 - 4/27 - Molarity Stoichiometry



Q = Find M of HCl.

$$2.0\text{g Zn} \left( \frac{1\text{mol Zn}}{65.39\text{g Zn}} \right) \left( \frac{2\text{mol HCl}}{1\text{mol Zn}} \right) = \frac{0.061\text{ mol HCl}}{0.035\text{ L}} = 1.8\text{ M HCl}$$

sat: 12.1 M



? M  
12 mL

1.5 M  
25 mL

known

$$M \cdot L = \text{mol}$$

$$\frac{1.5\text{ mol}}{\text{L}} \cdot 0.025\text{ L} = 0.038\text{ mol KOH}$$

$$0.038\text{ mol KOH} \left( \frac{1\text{ mol H}_3\text{PO}_4}{3\text{ mol KOH}} \right) = \frac{0.013\text{ mol H}_3\text{PO}_4}{0.012\text{ L}} = 1.1\text{ M H}_3\text{PO}_4$$

Molality - unit

$$(m) = \frac{\text{moles solute}}{\text{kg solvent}}$$

↑ LC, cursive

ex) You add 45g of NaCl into 250.g H<sub>2</sub>O. Find m.

$$45\text{g NaCl} \left( \frac{1\text{ mol NaCl}}{58.44\text{g}} \right) = \frac{0.77\text{ mol NaCl}}{0.250\text{ kg H}_2\text{O}} = 3.1\text{ m NaCl}$$

"molar"

# 5/3 Notes: Molality (new unit for concentration)

$$m = \frac{\text{mol solute (s)}}{\text{kg solvent (liq)}}$$

rem H<sub>2</sub>O:  $1\text{g} = 1\text{L}$  also  $1\text{g} = 1\text{mL}$   $1,000\text{mL} = 1\text{L}$

#1) You add 1.5 mol NaCl to 3,500. g H<sub>2</sub>O. Find *m*.

$$m = \frac{1.5 \text{ mol NaCl}}{3.500 \text{ kg}} = 3,500. \text{g} \left( \frac{1 \text{ kg}}{1,000 \text{ g}} \right)$$

$$0.43 \text{ m NaCl}$$

#2) You add 50 g NaCl to 750. mL of H<sub>2</sub>O.  
Find *m*:

$$50. \text{g NaCl} \left( \frac{1 \text{ mol}}{58.44 \text{ g NaCl}} \right) = \frac{0.86 \text{ mol NaCl}}{0.750 \text{ kg}} = 1.1 \text{ m NaCl}$$

$$750. \text{mL} \left( \frac{1 \text{ L}}{1000 \text{ mL}} \right) = 0.750 \text{ L}$$

#3) You add 1.0 g Urea (MW: 60.06 g/mol) in  
10 mL of H<sub>2</sub>O. Find *m*.

$$m: 1.0 \text{ g Urea} \left( \frac{1 \text{ mol}}{60.06 \text{ g}} \right) = \frac{0.017 \text{ mol Urea}}{0.010 \text{ kg}} = 1.7 \text{ m Urea}$$