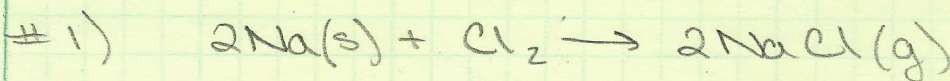


(FROM "LIMITING REACTANT AND THEORETICAL YIELD PRACTICE" WORKSHEET)

REMEMBER OUR PROCEDURE FROM YESTERDAY:

- ① WRITE OUT GIVEN/FIND.
- ② IDENTIFY RELEVANT MOLAR RATIOS
- ③ SET UP A PICKET FENCE FOR EACH REACTANT IN THE CHEMICAL RXN.
- ④ CIRCLE THE SMALLEST YIELD: THIS IS THE THEORETICAL YIELD
- ⑤ WHATEVER REACTANT PRODUCES THE THEORETICAL YIELD (THE GIVEN) IS THE LIMITING REACTANT.

LET'S LOOK AT #1 ON WORKSHEET:



STEP 1

GIVEN

7.25 mol Na

4.25 mol Cl₂

FIND

THEORETICAL

YIELD: _____ mol NaCl

STEP 2

2 mol Na : 2 mol NaCl

1 mol Cl₂ : 2 mol NaCl

MOLAR RATIO

LIMITING

REACTANT _____

STEP 3

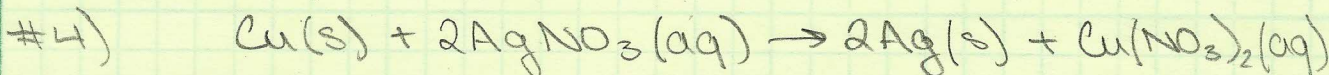
$$\frac{7.25 \text{ mol Na}}{1} \left(\frac{2 \text{ mol NaCl}}{2 \text{ mol Na}} \right) = 7.25 \text{ mol NaCl} \star$$

STEP 4, SMALLEST AMOUNT PRODUCED IS THEORETICAL YIELD

$$\frac{4.25 \text{ mol Cl}_2}{1} \left(\frac{2 \text{ mol NaCl}}{1 \text{ mol Cl}_2} \right) = 8.5 \text{ mol NaCl}$$

MOLAR RATIO

STEP 5: 7.25 mol OF Na PRODUCED THE SMALLEST THEORETICAL YIELD SO Na IS THE LIMITING REACTANT



STEP 1

GIVEN

100g Cu

100g AgNO₃

63.5g Cu : 1 mol Cu

169.91g AgNO₃ : 1 mol AgNO₃

107.9g Ag : 1 mol Ag

I'M INCLUDING THE MOLAR MASSES OF BOTH THE REACTANTS AND PRODUCTS BECAUSE I WILL

FIND

THEORETICAL YIELD:

_____ g Ag

LIMITING REACTANT: _____

NEED THEM IN ORDER TO REPORT THE MASSES IN THE UNITS OF MOLES. THAT ALLOWS ME TO COMPARE MOLE RATIO.

STEP 3

$$\frac{100g \text{ Cu}}{1} \left(\frac{1 \text{ mol Cu}}{63.5g \text{ Cu}} \right) \left(\frac{2 \text{ mol Ag}}{1 \text{ mol Cu}} \right) \left(\frac{107.9g \text{ Ag}}{1 \text{ mol Ag}} \right) = 339.84g \text{ Ag}$$

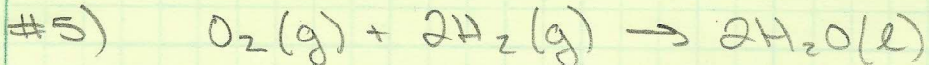
↑
↑
↑
 MOLAR MOLAR MOLAR
 MASS OF Cu RATIO MASS OF Ag

$$\frac{100g \text{ AgNO}_3}{1} \left(\frac{1 \text{ mol AgNO}_3}{169.91g \text{ AgNO}_3} \right) \left(\frac{2 \text{ mol Ag}}{2 \text{ mol AgNO}_3} \right) \left(\frac{107.9g \text{ Ag}}{1 \text{ mol Ag}} \right) = \boxed{63.50g \text{ Ag}}$$

STEP 4

*THEORETICAL YIELD

STEP 5
AgNO₃ IS LIMITING REACTANT



GIVEN

- 1.22g O₂
- 1.05g H₂
- 1mol O₂ : 2mol H₂O
- 2mol H₂ : 2mol H₂O
- 32.0g O₂ : 1mol O₂
- 2.02g H₂ : 1mol H₂
- 18.02g H₂O : 1mol H₂O

FIND:
 THEORETICAL YIELD:
 _____ g H₂O
 LIMITING REACTANT:

$$\frac{1.22g \text{ O}_2}{1} \left(\frac{1 \text{ mol O}_2}{32.0g \text{ O}_2} \right) \left(\frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol O}_2} \right) \left(\frac{18.02g \text{ H}_2\text{O}}{1 \text{ mol H}_2\text{O}} \right) = \boxed{1.37g \text{ H}_2\text{O}}$$

$$\frac{1.05g \text{ H}_2}{1} \left(\frac{1 \text{ mol H}_2}{2.02g \text{ H}_2} \right) \left(\frac{2 \text{ mol H}_2\text{O}}{2 \text{ mol H}_2} \right) \left(\frac{18.02g \text{ H}_2\text{O}}{1 \text{ mol H}_2\text{O}} \right) = 9.37g \text{ H}_2\text{O}$$

1.37g H₂O IS THEORETICAL YIELD
O₂ IS LIMITING REACTANT.