

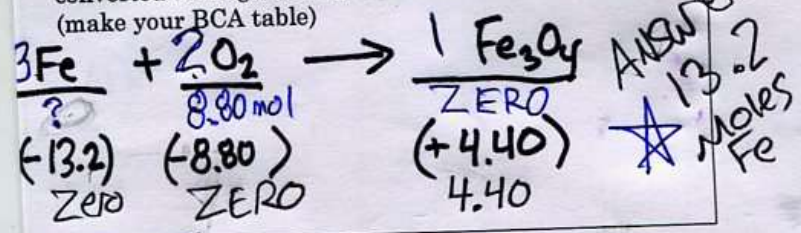
TODAY + TOMORROW ARE ALL REVIEW
PURPOSE: Get Solid for Friday's Test.
WARMUP: GLUE/TAPE/STAPLE
 INTO YOUR NOTEBOOK

Warmup, from October: Convert 49 g of oxygen to moles.

$$49 \text{ grams } O_2 \times \left(\frac{1 \text{ mol}}{32 \text{ grams}} \right) = 1.53 \text{ moles } O_2$$

Question type 1

Iron metal and oxygen combine to form the magnetic oxide of iron, Fe₃O₄. How many moles of iron can be converted to magnetite by 8.80 moles of pure oxygen? (make your BCA table)

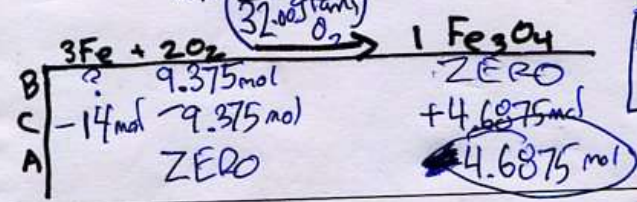


Question type 2

Using the above balanced equation, if 300. grams of O₂ react, how many grams of Fe₃O₄ should form? This is the circle one. (actual yield / theoretical yield)

Convert to moles first!

$$300 \text{ grams } O_2 \times \left(\frac{1 \text{ mol}}{32.00 \text{ grams}} \right) = 9.375 \text{ mol } O_2$$



Answer

$$4.6875 \times \frac{231}{1} = 1080 \text{ grams}$$

Answer:
1080 grams

Question type 3

In the previous problem, if only 423 grams of Fe₃O₄ form, what was the percent yield?

$$\frac{423 \text{ grams}}{1080 \text{ grams}} \times 100 = 39.1\%$$

Tips for solving B. C. A. Tables

- ★) ALWAYS BALANCE THE EQUATION AND WRITE IT ABOVE THE B.C.A. TABLE
- ★) NEVER WRITE ANYTHING INSIDE THE B.C.A. TABLE EXCEPT 'MOLES'
- ★) ON THE "CHANGE" LINE GO SIDEWAYS USING MOLE RATIOS (THE COEFFICIENTS FROM THE BALANCED EQUATION).

KEEP YOUR LAB SAFE.
WE WILL FINISH IT
FRIDAY, AFTER THE TEST

DO A GOOD JOB
ON TONIGHT'S MALALA
SHEET -- WE WILL
WHITEBOARD TOMORROW

TUESDAY'S NOTES - - -

PURPOSE How DO WE SAY
How WELL OUR LAB WENT?

#1) "THEORETICAL YIELD"

is how much we predict
we will get

#2) "ACTUAL YIELD"

How much we ACTUALLY
GET.

#3) "Percent Yield"

$$\% \text{ yield} = \frac{\text{Actual Yield}}{\text{Theoretical Yield}} \times 100$$



Name _____
 Period _____

Get extra credit: nominate a woman for women's history month. Go to the class website.

For each of the problems below:
 a. Write the balanced chemical equation.
 b. Identify the given (with units) and what you want to find (with units).
 c. Show set up with units. Check sig figs, give final answer with units and label.

1. Using the Hoffman apparatus for electrolysis, a chemist decomposes 36 g of water into its gaseous elements. How many grams of hydrogen gas should she get (theoretical yield)?

Bal. Equation: $2 \text{H}_2\text{O} \rightarrow 2 \text{H}_2 + \text{O}_2$

Before	2.00 mol	0 mol	0 mol	$36 \text{ g H}_2\text{O} \times \left(\frac{1 \text{ mol H}_2\text{O}}{18.02 \text{ g H}_2\text{O}} \right) = 2.00 \text{ mol H}_2\text{O}$ $2.00 \text{ mol H}_2\text{O} \times \left(\frac{2.02 \text{ g H}_2}{1 \text{ mol H}_2} \right) = \boxed{4.04 \text{ g H}_2}$
Change	-2.00 mol	+2.00 mol	+1.00 mol	
After	0 mol	2.00 mol	1.00 mol	

2. Recall that liquid sodium reacts with chlorine gas to produce sodium chloride. You want to produce 581 g of sodium chloride. How many grams of sodium are needed?

3. You eat 180.0 g of glucose (90 M&Ms). If glucose, $\text{C}_6\text{H}_{12}\text{O}_6$, reacts with oxygen gas to produce carbon dioxide and water, how many grams of oxygen will you have to breathe in to burn the glucose?

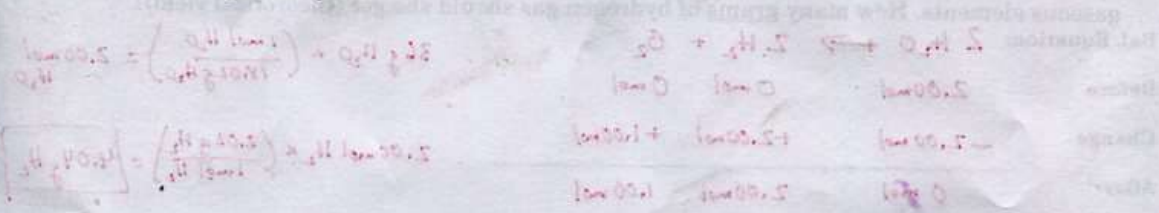
4. Suppose 4.61 g of zinc was allowed to react with hydrochloric acid to produce zinc chloride and hydrogen gas. How much zinc chloride should you get? Suppose that you actually recovered 8.56 g of zinc chloride. What is your percent yield?

$4.61 \text{ g Zn} \times \left(\frac{1 \text{ mol Zn}}{65.38 \text{ g Zn}} \right) \times \left(\frac{1 \text{ mol ZnCl}_2}{1 \text{ mol Zn}} \right) \times \left(\frac{136.3 \text{ g ZnCl}_2}{1 \text{ mol ZnCl}_2} \right) = 9.47 \text{ g ZnCl}_2$

$\% \text{ Yield} = \left(\frac{8.56 \text{ g}}{9.47 \text{ g}} \right) \times 100 = 90.3\%$

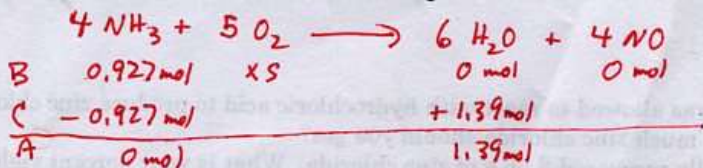
5. Determine the mass of carbon dioxide that should be produced in the reaction between 3.74 g of carbon and excess O₂. What is the % yield if 11.34 g of CO₂ is recovered?

6. In the reaction between excess K(s) and 4.28 g of O₂(g), potassium oxide is formed. What mass would you expect to form (theoretical yield)? If 17.36 g of K₂O is actually produced, what is the percent yield?



7. Determine the mass of carbon dioxide one could expect to form (and the percent yield) for the reaction between excess CH₄ and 11.6 g of O₂ if 5.38 g of carbon dioxide gas is produced along with some water vapor.

8. Determine the mass of water vapor you would expect to form (and the percent yield) in the reaction between 15.8 g of NH₃ and excess oxygen to produce water and nitric oxide (NO). The mass of water actually formed is 21.8 g.



Handwritten calculation for percent yield:

$$\frac{21.8 \text{ g}}{25.0 \text{ g}} \times 100 = 87.3\%$$

Handwritten calculations for limiting reagent and theoretical yield:

$$15.8 \text{ g NH}_3 \times \left(\frac{1 \text{ mol NH}_3}{17.04 \text{ g NH}_3} \right) = 0.927 \text{ mol NH}_3$$

$$0.927 \text{ mol NH}_3 \times \left(\frac{6 \text{ mol H}_2\text{O}}{4 \text{ mol NH}_3} \right) = 1.39 \text{ mol H}_2\text{O}$$

$$1.39 \text{ mol H}_2\text{O} \times \left(\frac{18.02 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} \right) = 25.0 \text{ g H}_2\text{O}$$

Check your answers (1) 4.0 g H₂ (2) 228 g Na (3) 192 g O₂ (4) 9.61 g Zn, 89.1%
 (5) 13.73 g CO₂, 82.6% (6) 25.3 g K₂O, 68.8% (7) 7.99 g CO₂, 67.4% (8) 25.1 g H₂O, 86.9%