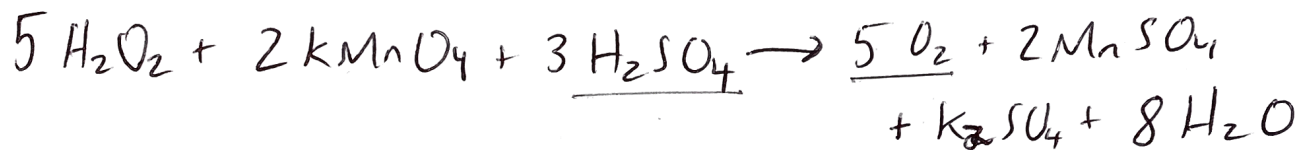


★ New Molar parameters:

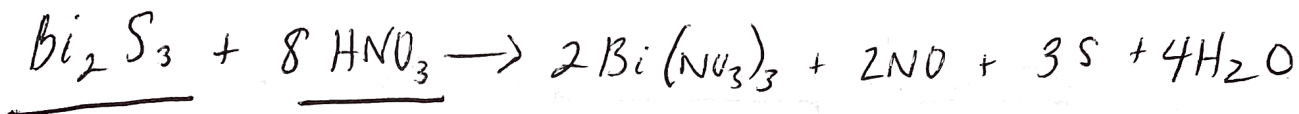
A gas at STP (standard temp & pressure)

$$1 \text{ mol} = 22.4 \text{ L} \quad \frac{1 \text{ mol}}{22.4 \text{ L}}$$

How many L of  $\text{O}_2$  @ STP can be produced from 4.92g  $\text{H}_2\text{SO}_4$

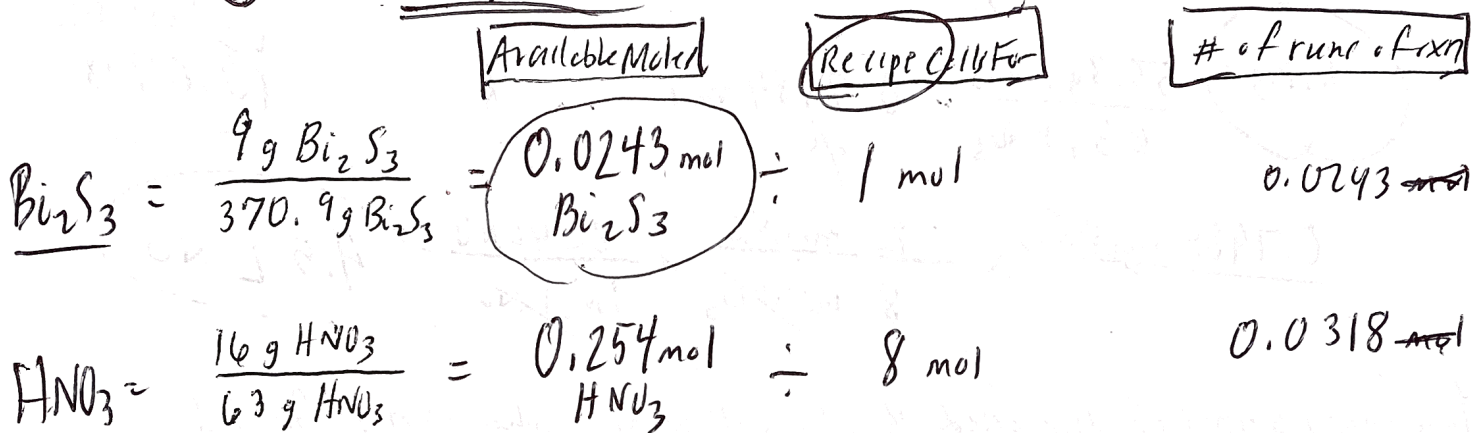


$$\frac{4.92 \text{ g } \text{H}_2\text{SO}_4}{98 \text{ g } \text{H}_2\text{SO}_4} \times \frac{1 \text{ mol } \text{H}_2\text{SO}_4}{1 \text{ mol } \text{H}_2\text{SO}_4} \times \frac{5 \text{ mol } \text{O}_2}{3 \text{ mol } \text{H}_2\text{SO}_4} \times \frac{22.4 \text{ L } \text{O}_2}{1 \text{ mol } \text{O}_2} = 1.88 \text{ L } \text{O}_2$$



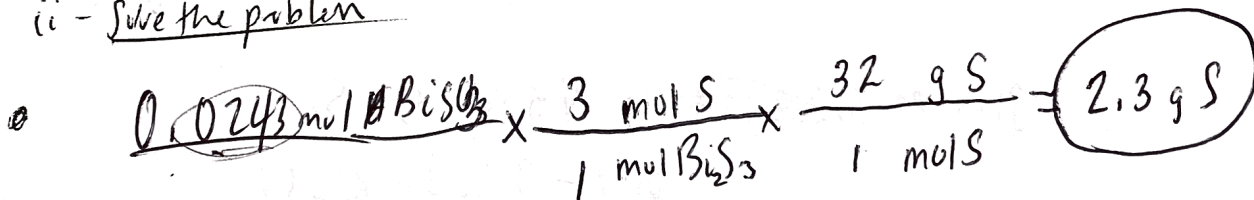
(A) How many grams of S is produced if we reacted 9 grams of  $\text{Bi}_2\text{S}_3$  with 16 g  $\text{HNO}_3$ ?

(i) Find Limiting Reactant



LR =  $\text{Bi}_2\text{S}_3$  is Limiting    ER =  $\text{HNO}_3$

ii - Solve the problem



(B) How many Liters of NO @ STP is produced if you react  
 45.8 g  $\text{Bi}_2\text{S}_3$  with 50.3 g  $\text{HNO}_3$  ? LR  
 (0.1235 mol)

Limiting Reactant	We Have	We Need	# Rxn Run
$\text{Bi}_2\text{S}_3$	$\frac{45.8 \text{ g } \text{Bi}_2\text{S}_3}{370.9 \text{ g}} = 0.1235 \text{ mol}$	1	0.1235 x
$\text{HNO}_3$	$\frac{50.3 \text{ g } \text{HNO}_3}{63 \text{ g } \text{HNO}_3} = 0.7984 \text{ mol}$	8	0.0998 x

Limiting React  
 0.0998 x

$$0.7984 \text{ mol } \text{HNO}_3 \times \frac{2 \text{ mol NO}}{8 \text{ mol } \text{HNO}_3} \times \frac{22.4 \text{ L NO}}{1 \text{ mol NO}} = 4.5 \text{ L NO}$$

(C) How many grams of unreacted  $\text{Bi}_2\text{S}_3$  will remain when rxn is finished

$$0.7984 \text{ mol } \text{HNO}_3 \times \frac{1 \text{ mol } \text{Bi}_2\text{S}_3}{8 \text{ mol } \text{HNO}_3} \times \frac{370.9 \text{ g } \text{Bi}_2\text{S}_3}{1 \text{ mol } \text{Bi}_2\text{S}_3} = 37.02 \text{ g } \text{Bi}_2\text{S}_3 \text{ Used in rxn}$$

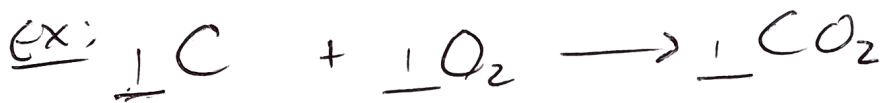
Started ~~50.3 g HNO<sub>3</sub>~~ 45.8 g  $\text{Bi}_2\text{S}_3$

used - 37.02 g  $\text{Bi}_2\text{S}_3$

8.78 g  $\text{Bi}_2\text{S}_3$  remains

Limiting Reactant - Reactant that limits the amt of product formed in a reaction.  
= STOPS REACTION

Excess Reactant - Reactant that is not used up completely = LEFTOVERS



Mix 5 mol C + 10 mol O<sub>2</sub>

C = Run 5x

O<sub>2</sub> = Run 10x

↑  
Limiting Rxt

% Yield -

$$\frac{\text{Actual Yield}}{\text{Theoretical Yield}} \times 100$$

Ex<sup>n</sup> Produce a mass of 17.34g  
Calculation produced 19.23g

$$= \frac{17.34}{19.23} \times 100$$

$$= 90.2\%$$