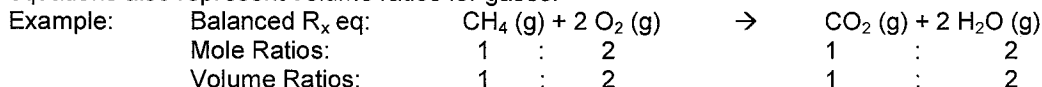


Dougherty Valley HS Chemistry
Gas Stoichiometry WS
Write on a separate sheet of paper!

Name:
Date:
Period:

Because of the molar volume ratio (one mole of any gas occupies 22.4 L at STP, mole ratios in balanced reaction equations also represent volume ratios for gases!



Volume to Volume Problems:

1. Balance each combustion reaction equation and determine the volume of oxygen needed to react with each fuel.

Gas	Combustion Reaction	Vol. Fuel	Vol. Oxygen
Ethane	$\text{C}_2\text{H}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$	10 mL	
Acetylene	$\text{C}_2\text{H}_2 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$	10 mL	
Propane	$\text{C}_3\text{H}_8 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$	10 mL	
Butane	$\text{C}_4\text{H}_{10} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$	10 mL	
MAPP gas	$\text{C}_3\text{H}_4 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$	10 mL	

Mole to Volume Problems:

2. Assume that 1.75 moles of propane reacts completely at 375 K and 4 atm. Use this reaction equation to answer the following questions:



- Write the balanced reaction equation.
- What volume of propane reacted? (*hint: use the ideal gas law!*)
- What volume of carbon dioxide was produced? (*hint: use the ideal gas law to solve for volume of propane, then use volume to volume stoich to solve for volume of carbon dioxide!*)
- What volume of water vapor was produced? (*hint: use the ideal gas law to solve for volume of propane, then use volume to volume stoich to solve for volume of water vapor!*)

you did this in part A
↓ A
↑ from part A

3. Assume that 3.5 moles of MAPP gas reacts completely at 300 K and 1.2 atm. Use this reaction equation to answer the following questions:



- Write the balanced reaction equation.
- What volume of MAPP gas reacted?
- What volume of oxygen gas will be used up?
- What volume of carbon dioxide gas will be produced?

4. Assume that 0.5 moles of MAPP gas reacts completely at 350 K and 3 atm. Use this reaction equation to answer the following questions:

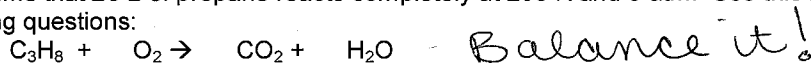


- What volume of water vapor will be produced?

Volume to Mass Problems:

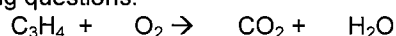
For these problems you will use gas volume ratios and the ideal gas law to solve stoichiometry problems where you start with a volume and solve for a mass.

5. Assume that 20 L of propane reacts completely at 295 K and 3 atm. Use this reaction equation to answer the following questions:



- How many moles of oxygen gas will be used up? (*hint: use volume to volume stoich to figure out the volume of oxygen gas, then use the ideal gas law to solve for n!*)
- How many grams of water vapor will be produced? (*hint: figure out the volume of water vapor, then use the ideal gas law to solve for n, then use molar mass to solve for grams!*)
- How many grams of CO_2 will be produced? (*hint: figure out the volume of carbon dioxide, then use the ideal gas law to solve for n, then use molar mass to solve for grams!*)

6. Assume that 30 L of MAPP gas reacts completely at 300 K and 1.2 atm. Use this reaction equation to answer the following questions:



- How many moles of oxygen gas will react with the given volume of MAPP gas?
- How many moles of water vapor will be produced?
- How many grams of water vapor will be produced?
- How many grams of CO_2 will be produced?

Mass to Volume Problems:

For these problems you will use gas volume ratios and the ideal gas law to solve stoichiometry problems where you start with a mass and solve for a volume.

7. Assume that 50 g of propane reacts completely at 350 K and 2.5 atm. Use this reaction equation to answer the following questions:



- How many moles of propane reacted? (*hint: use molar mass!*)
- What volume of propane reacted? (*hint: use molar mass, then use the ideal gas law to solve for volume*)
- What volume of oxygen gas will be used up? (*hint: use molar mass to figure out the moles of propane gas, then use the ideal gas law to solve for propane volume, then use volume-volume stoichiometry to solve for volume of oxygen!*) ← Part A
- What volume of water vapor will be produced? (*hint: use molar mass to figure out the moles of propane gas, then use the ideal gas law to solve for propane volume, then use volume-volume stoichiometry to solve for volume of water!*) ← Part F

↑ From Part B

8. Assume that 90 g of MAPP gas reacts completely at 200 K and 5 atm. Use this reaction equation to answer the following questions:



- How many moles of MAPP gas reacted?
- What volume of MAPP gas reacted?
- What volume of oxygen gas is required for this reaction?
- What volume of carbon dioxide gas will be produced?