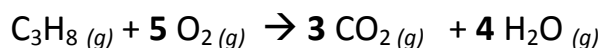


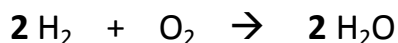
Molar Volume of a Gas

Name _____

1. Propane, C_3H_8 , is a gas that is sometimes used as a fuel for cooking and heating. The complete combustion of propane occurs according to the following equation.



- What will be the volume, in liters, of oxygen required for the complete combustion of 0.350 L of propane?
 - What will be the volume of carbon dioxide produced in the reaction of 0.350 L propane?
 - What volume of water vapor will form if 22.4 L (1 mole) of propane is used?
 - How much oxygen is consumed if 9.50 L of carbon dioxide was formed?
 - What is the mole ratio of propane to carbon dioxide?
2. Hydrogen combines with oxygen to form water.

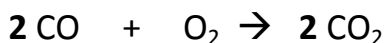


- Assuming all volume measurements are made at the same temperature and pressure, what volume of hydrogen gas is needed to react completely with 4.55 L of oxygen gas to produce water vapor.
- If you are going to make a mole of water vapor (22.4L), how much hydrogen would you need to start with?

- c. What is the mole ratio of hydrogen to water?

- d. If you have unlimited hydrogen and 34.0 L O₂, what volume of water vapor could you create?

3. Carbon monoxide combines with gaseous oxygen to form carbon dioxide.



- a. What volume of oxygen gas is needed to react completely with 0.626 L of carbon monoxide gas, CO, to form gaseous carbon dioxide?

- b. If 40.5 L of CO are reacted with unlimited oxygen, how much carbon dioxide will form?

- c. This reaction formed 11.2 moles of carbon dioxide gas. How many moles of oxygen were used?

4. Use the combined gas law to solve the following problems:

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

- a. If I initially have a gas at a pressure of 6 atm, a volume of 19 liters, and a temperature of 250 K, and then I raise the pressure to 7 atm and increase the temperature to 325 K, what is the new volume of the gas?

- b. If I have 15 liters of gas at a temperature of 77 °C and a pressure of 92 atm, what will be the pressure of the gas if I raise the temperature to 104 °C and decrease the volume to 9 liters?

- c. If I have 8 L of gas at a pressure of 7 atm and a temperature of 60 °C, what will be the temperature of the gas if I decrease the volume of the gas to 3.6 L and decrease the pressure to 1.9 atm?