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Workshop 11 – Gas Laws

Show calculation setups and answers for all problems below.

1. You have a sample of 2.0 L of oxygen gas at 3.0 atm pressure. If you reduce the pressure to 0.50 atm, what is the volume of the gas?

2. A sample of argon gas occupies 2.50 L at 25.0 °C. If the gas is heated at constant pressure, what will the volume be at 99.9 °C?

3. A 252 mL sample of nitrogen gas is at 715 torr and 25.0 °C. What volume would the sample occupy at 760. torr and 0 °C?

4. How many moles of methane (CH₄) are present in a 10.0 L sample at STP?

5. How many liters would 14.0 grams of chlorine gas occupy at 300.0 K and 1.51 atm?

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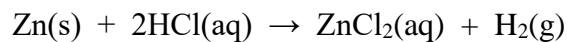
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6. How many grams of CH₄ at STP would fill a 1.00 L flask?

7. A gas has a pressure of 1.07 atm, a volume of 13.7 L, and a mass of 28.0 g at a temperature of 294 K. What is the molar mass of this gas?

8. A sample of O₂ gas is stored at 30.0 °C and 755 torr. If the volume was 125 mL, how much did the oxygen weigh?

9. Small quantities of hydrogen gas can be prepared in the laboratory by the addition of aqueous hydrochloric acid to metallic zinc according to the following balanced equation:



Suppose 240. mL of hydrogen gas is collected at 40.0 °C and has a pressure of 1.030 atm by this process. How many grams of zinc must have reacted to produce this quantity of hydrogen?
