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3.4 Ideal Gas Law

AP Chemistry

R = 0.08206 L·atm/(mol·K) = 62.36 L·torr/(mol·K). K = °C + 273. Show all work with units and correct significant figures.

1. A 4.00 L tank holds 0.500 mol of CH_4 gas at 35 °C. What is the pressure of the gas in atm?

2. What volume does 12.0 g of oxygen gas occupy at 745 torr and 22 °C?

3. A 1.17 g sample of an unknown gas fills a 0.500 L flask at 27 °C and 0.812 atm.

(a) Calculate the molar mass of the gas.

(b) Is the gas Ar, SO_2, or Cl_2? Explain.

4. A sealed, rigid steel can of helium is at 1.50 atm and 20 °C. It is left in a hot car and warms to 120 °C. What is the new pressure?

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5. Use $P_1V_1/(n_1T_1) = P_2V_2/(n_2T_2)$ to predict each change. Give the factor and a one-sentence reason.

(a) The volume of a gas is cut in half at constant n and T. What happens to P?

(b) The moles of gas are tripled at constant P and T. What happens to V?

(c) The kelvin temperature is doubled and the volume is doubled at constant n. What happens to P?

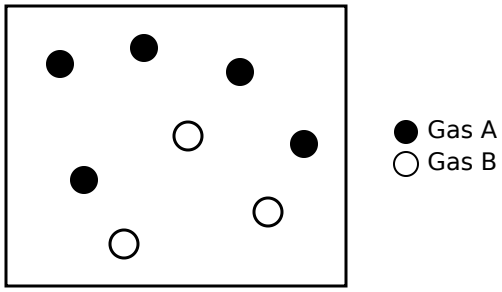
6. A 10.0 L container at 25 °C holds 0.300 mol N_2, 0.100 mol O_2, and 0.0500 mol CO_2.

(a) What is the total pressure in atm?

(b) What is the mole fraction of O_2?

(c) What is the partial pressure of O_2?

7. The container below holds a mixture of Gas A and Gas B at a total pressure of 2.40 atm.



(a) What is the partial pressure of each gas?

(b) Four more particles of Gas B are added at constant volume and temperature. What is the new total pressure? Does the partial pressure of Gas A change? Explain.

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