Warm Up

Determine the volume of gas that 0.414 mol of chlorine will occupy @ STP.

$$0.414 \text{ mol } Cl_2 \times \frac{22.4 \text{ L } Cl_2}{1 \text{ mol } Cl_2} = 9.27 \text{ L } Cl_2$$

Check Homework

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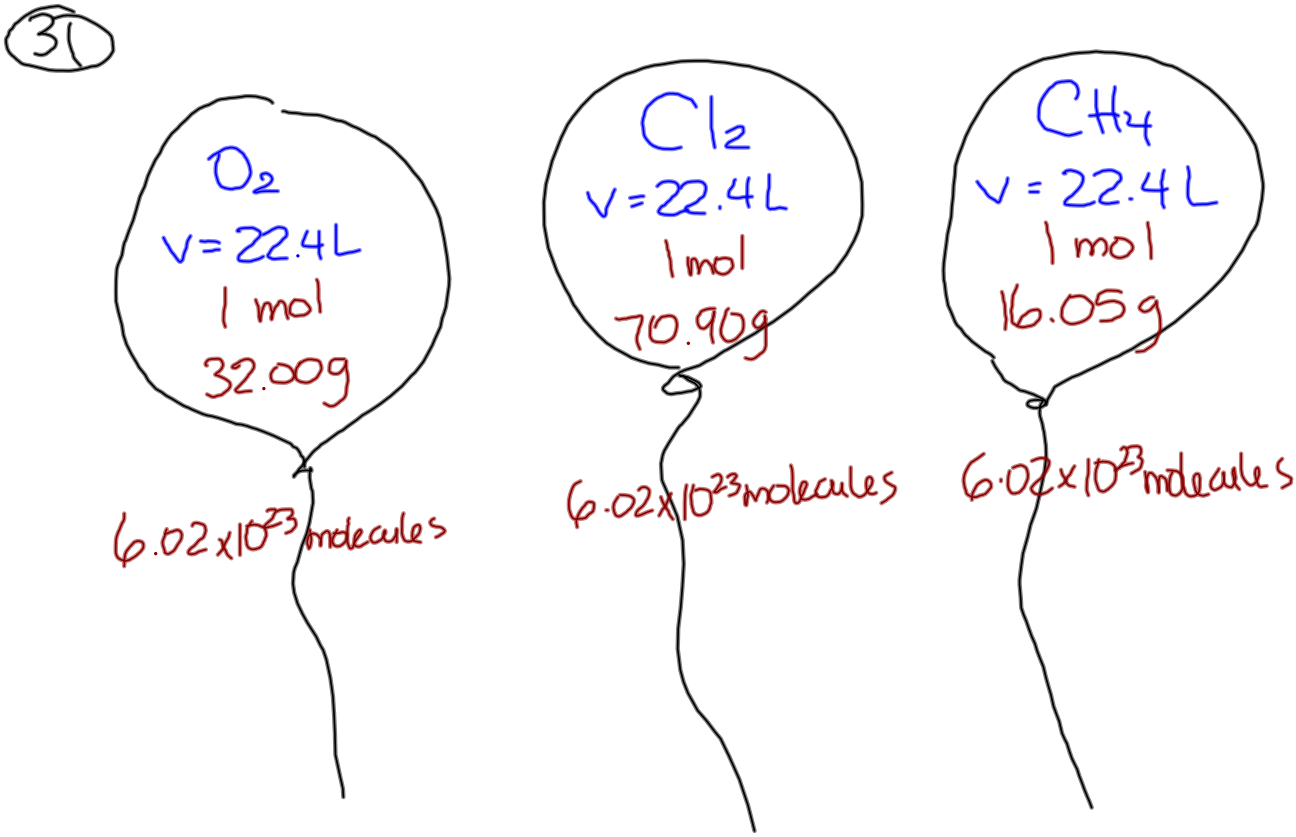
p. 303 #24-28, 31

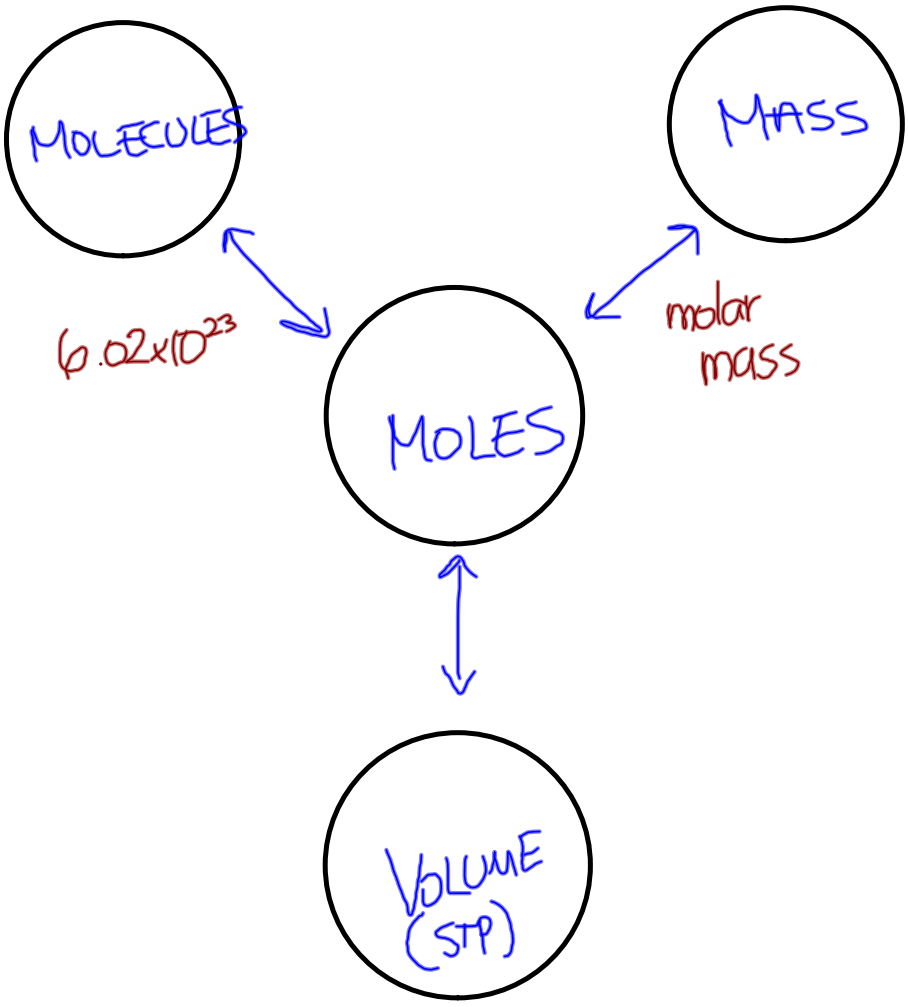
(26) $5.66 \text{ mol } CaCO_3 \times \frac{100.09 \text{ g } CaCO_3}{1 \text{ mol } CaCO_3} = 567 \text{ g } CaCO_3$

$CaCO_3 \rightarrow (1 \times 40.08) + (1 \times 12.01) + (3 \times 16.00)$

$= 100.09 \text{ g/mol}$

(31)




MOLECULES
MASS
6.02×10^{23}
molar mass
MOLES
VOLUME (STP)

Percent Composition

The relative amounts of element in a compound are expressed as the percent composition (by mass) for each element within the compound.

Ex. K_2CrO_4

K - 40.3%
Cr - 26.8%
O - 32.9%

Percent Composition from Mass Data

When a 13.60 g sample containing only magnesium and oxygen is decomposed, 5.40 g of oxygen is obtained. What is the percent composition of this compound?

$Mg_xO_y \longrightarrow$ magnesium + oxygen

13.60 g 8.20 g 5.40 g

$$\%\,Mg = \frac{\text{mass Mg}}{\text{mass } Mg_xO_y} \times 100\%$$

$$\%\,Mg = \frac{8.20\,g}{13.60\,g} \times 100\%$$

$$\%\,Mg = 60.3\%$$

$$\%\,O = \frac{\text{mass O}}{\text{mass } Mg_xO_y} \times 100\%$$

$$\%\,O = \frac{5.40\,g}{13.60\,g} \times 100\%$$

$$\%\,O = 39.7\%$$

Percent Composition from the Chemical Formula

Ex. Na_2CO_3

$\hookrightarrow (2 \times 22.99) + (1 \times 12.01) + (3 \times 16.00)$

$= 105.99\ g/mol$

$$\%Na = \frac{\text{mass Na in 1 mol}}{\text{molar mass } Na_2CO_3} \times 100\%$$

$$\%Na = \frac{(2 \times 22.99\ g/mol)}{105.99\ g/mol} \times 100\%$$

$\%Na = 43.4\%$

$$\%C = \frac{\text{mass C in 1 mol}}{\text{molar mass } Na_2CO_3} \times 100\%$$

$$\%C = \frac{12.01\ g/mol}{105.99\ g/mol} \times 100\%$$

$\%C = 11.3\%$

$$\%O = \frac{\text{mass O in 1 mol}}{\text{molar mass } Na_2CO_3} \times 100\%$$

$$\%O = \frac{(3 \times 16.00\ g/mol)}{105.99\ g/mol} \times 100\%$$

$\%O = 45.3\%$

Calculate the percent composition of propane (C_3H_8).

Homework

p. 306 #32, 33
p. 307 #34, 35