Warm Up

WANT
HAVE

Calculate the number of moles found in 8.90×10^{24} molecules of NH_3.

8.90×10^{24} molecules NH_3 $\times \frac{1 \text{ mol } NH_3}{6.02 \times 10^{23} \text{ molecules } NH_3}$

$= 14.8 \text{ mol } NH_3$

Homework

Worksheet - Molar Calculations

(11) $27.1\ g\ Al_2O_3 \times \frac{1\ mol\ Al_2O_3}{101.96\ g\ Al_2O_3} =$ **0.266 mol Al_2O_3**

$Al_2O_3 \rightarrow (2 \times 26.98) + (3 \times 16.00) = 101.96\ g/mol$

Molar calculations worksheet

1. 8.97×10^{-3} mol
2. 1.49×10^{25} atoms
3. 1.30×10^{26} atoms
4. 46.01 g/mol
5. 14 300 mol
6. 342.34 g/mol
7. 159.70 g/mol
8. 4.24×10^{24} molecules
9. 1.79×10^{25} atoms
10. 643 g
11. 0.266 mol
12. 10 900 g
13. 6.26 mol

Mole-Volume Relationship

Avagadro's Hypothesis
Equal volumes of gases at the same temperature and pressure contain equal number of particles.

$1\ mol\ O_2 = 22.4\ L\ O_2$

$1\ mol\ He = 22.4\ L\ He$

Standard temperature and pressure (STP)
0.^{o}C and 101.3kPa

At STP, 1 mol (6.02 x10^{23} representative particles) of any gas contains 22.4 L.

V_m @ STP = 22.4 L/mol

Calculating Volume at STP

Ex. Determine the volume of oxygen gas will 0.375 mol occupy at STP.

$$0.375 \text{ mol } O_2 \times \frac{22.4 \text{ L } O_2}{1 \text{ mol } O_2} = 8.40 \text{ L } O_2$$

Homework

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