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More Moles

Solve the following problems: Grams to moles, moles to grams

- 5.5 moles of C = 66 g C
 $5.5 \text{ mole} \times \frac{12 \text{ g}}{\text{mole}} = 66 \text{ g}$
- 28.7 g of Ar = 0.718 moles Ar
 $28.7 \text{ g} \times \frac{1 \text{ mole}}{39.95 \text{ g}} = 0.718 \text{ moles}$
- 34.7 g of Ni = 0.5912 moles Ni
 $34.7 \text{ g} \times \frac{1 \text{ mole}}{58.69 \text{ g}} = 0.5912 \text{ moles}$
- 0.00621 moles of K₂S = 0.6847 g K₂S
 $0.00621 \text{ moles} \times \frac{110.27 \text{ g}}{\text{mole}} = 0.6847 \text{ g}$
- 64.85 g of Cu = 1.02 moles Cu
 $64.85 \text{ g} \times \frac{1 \text{ mole}}{63.55 \text{ g}} = 1.02 \text{ moles}$
- 198.55 g of Fe = 3.55 moles Fe
 $198.55 \text{ g} \times \frac{1 \text{ mole}}{55.85 \text{ g}} = 3.55 \text{ moles}$
- 3.75 moles of FeCl₃ = 608.25 g FeCl₃
 $3.75 \text{ moles} \times \frac{162.2 \text{ g}}{\text{mole}} = 608.25 \text{ g}$
- 30.6 moles of BaSO₄ = 7141.12 g BaSO₄
 $30.6 \text{ moles} \times \frac{233.37 \text{ g}}{\text{mole}} = 7141.12 \text{ g}$
- 0.847 moles of CuNO₃ = 106.34 g CuNO₃
 $0.847 \text{ moles} \times \frac{125.55 \text{ g}}{\text{mole}} = 106.34 \text{ g}$
- 50.51 g of Zn = 0.772 moles Zn
 $50.51 \text{ g} \times \frac{1 \text{ mole}}{65.39 \text{ g}} = 0.772 \text{ moles}$

Solve the following problems: All of the following are at STP conditions.
Liters to moles, moles to Liters

- 1.25 moles of O₂ gas = 28 L of O₂ gas
 $1.25 \text{ moles} \times \frac{22.4 \text{ L}}{\text{mole}} = 28 \text{ L}$
- 0.75 moles of HCl gas = 16.8 L of HCl gas
 $0.75 \text{ moles} \times \frac{22.4 \text{ L}}{\text{mole}} = 16.8 \text{ L}$
- 5.67 Liters of CO₂ gas = 0.253 moles of CO₂ gas
 $5.67 \text{ L} \times \frac{\text{mole}}{22.4 \text{ L}} = 0.253 \text{ moles}$
- 46.75 Liters of C₄H₉O gas = 2.09 moles of C₄H₉O gas
 $46.75 \text{ L} \times \frac{\text{mole}}{22.4 \text{ L}} = 2.09 \text{ moles}$
- 4.35 moles of N₂ gas = 97.44 L of N₂ gas
 $4.35 \text{ moles} \times \frac{22.4 \text{ L}}{\text{mole}} = 97.44 \text{ L}$

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16. 0.35 moles of HF gas = $\frac{7.84}{0.35 \text{ moles} \times \frac{22.4 \text{ L}}{\text{mole}}}$ L of HF gas = 7.84 L
17. 7.11 moles of PbI₂ gas = $\frac{159.3}{7.11 \text{ moles} \times \frac{22.4 \text{ L}}{\text{mole}}}$ L of PbI₂ gas = 159.3 L
18. 137.8 Liters of BaNO₃ gas = $\frac{6.15}{137.8 \text{ L} \times \frac{\text{mole}}{22.4 \text{ L}}}$ moles of BaNO₃ gas = 6.15 moles
19. 675 Liters of KMnO₄ gas = $\frac{30.13}{675 \text{ L} \times \frac{\text{mole}}{22.4 \text{ L}}}$ moles of KMnO₄ gas = 30.13 moles
20. 1300 Liters of H₂ gas = $\frac{58}{1300 \text{ L} \times \frac{\text{mole}}{22.4 \text{ L}}}$ moles of H₂ gas = 58 moles

Moles

1. Find the mass of 0.98 mol of CaCl₂.

$$\begin{array}{l} \text{Ca} = 40.08 \text{ g} \\ \text{Cl} = 2 \times 35.45 \text{ g} \\ \hline 110.98 \text{ g/mole} \end{array}$$
$$0.98 \text{ moles} \times \frac{110.98 \text{ g}}{\text{mole}} = 108.76 \text{ grams}$$

2. A bottle of PbSO₄ contains 158.1g of the compound. How many moles of PbSO₄ are in the bottle?

$$\begin{array}{l} \text{Pb} = 207.2 \text{ g} \\ \text{S} = 32.07 \text{ g} \\ \text{O} = 4 \times 16.00 \text{ g} \\ \hline 303.27 \text{ g/mole} \end{array}$$
$$158.1 \text{ g} \times \frac{\text{mole}}{303.27 \text{ g}} = 0.5213 \text{ moles}$$

3. Find the mass of 1.112 mol of HF.

$$\begin{array}{l} \text{H} = 1.01 \text{ g} \\ \text{F} = 19.00 \text{ g} \\ \hline 20.01 \text{ g/mole} \end{array}$$
$$1.112 \text{ moles} \times \frac{20.01 \text{ g}}{\text{mole}} = 22.25 \text{ grams}$$

4. Determine the number of moles of C₅H₁₂ that are in 362.8g of the compound.

$$\begin{array}{l} \text{C} = 5 \times 12.01 \text{ g} \\ \text{H} = 12 \times 1.01 \text{ g} \\ \hline 72.17 \text{ g/mole} \end{array}$$
$$362.8 \text{ g} \times \frac{\text{mole}}{72.17 \text{ g}} = 5.027 \text{ moles}$$

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5. Find the mass of 0.159 mol of SiO₂.

$$\begin{aligned} \text{Si} &= 28.09 \text{ g} \\ \text{O} &= 2 \times 16.00 \text{ g} \\ &= 60.09 \text{ g/ mole} \end{aligned}$$

$$0.159 \text{ moles} \times \frac{60.09 \text{ g}}{\text{mole}} = 9.55 \text{ grams}$$

6. You are given 12.35g of C₄H₈O₂. How many moles of the compound do you have?

$$\begin{aligned} \text{C} &= 4 \times 12.01 \text{ g} \\ \text{H} &= 8 \times 1.01 \text{ g} \\ \text{O} &= 2 \times 16.00 \text{ g} \\ &= 88.12 \text{ g/ mole} \end{aligned}$$

$$12.35 \text{ g} \times \frac{\text{mole}}{88.12 \text{ g}} = 0.140 \text{ moles}$$

7. Find the mass of 3.66 mol of N₂.

$$\text{N} = 2 \times 14.01 \text{ g} = 28.02 \text{ g/ mole}$$

$$3.66 \text{ moles} \times \frac{28.02 \text{ g}}{\text{mole}} = 102.55 \text{ grams}$$

8. A bottle of KMnO₄ contains 66.38g of the compound. How many moles of KMnO₄ does it contain?

$$\begin{aligned} \text{K} &= 39.1 \text{ g} \\ \text{Mn} &= 54.94 \text{ g} \\ \text{O} &= 4 \times 16.00 \text{ g} \\ &= 158.04 \text{ g/ mole} \end{aligned}$$

$$66.38 \text{ g} \times \frac{\text{mole}}{158.04 \text{ g}} = 0.420 \text{ moles}$$

9. Determine the number of atoms that are in 0.58 mol of Se.

$$0.58 \text{ moles} \times \frac{6.02 \times 10^{23} \text{ atoms}}{\text{mole}} = 3.49 \times 10^{23} \text{ atoms}$$

10. How many moles of barium nitrate (BaNO₃) contain 55.4 grams?

$$\begin{aligned} \text{Ba} &= 137.33 \text{ g} \\ \text{N} &= 14.01 \text{ g} \\ \text{O} &= 3 \times 16.00 \text{ g} \\ &= 199.34 \text{ g/ mole} \end{aligned}$$

$$55.4 \text{ g} \times \frac{\text{mole}}{199.34 \text{ g}} = 0.2779 \text{ moles}$$

11. Determine the number of atoms that are in 1.25 mol of O₂.

$$1.25 \text{ moles} \times \frac{6.02 \times 10^{23} \text{ atoms}}{\text{mole}} = 7.525 \times 10^{23} \text{ atoms}$$

12. How many moles of magnesium bromide (MgBr₂) are contained in 5.38 liters at STP?

$$5.38 \text{ L} \times \frac{\text{mole}}{22.4 \text{ L}} = 0.24 \text{ L}$$