

C11 - 3.3 - Moles/Atoms/Particles/Molecules Notes

$$\frac{6.02 \times 10^{23} \text{ particles}}{\text{mol}}$$

$$\frac{\text{mol (s)}}{\text{mol (s)}}$$

How many atoms in 1 mol of carbon? $1 \times 6.02E23 = 6.02E23$ Calculator

$$\text{Atoms C} = 1 \text{ mol C} \times \frac{6.02 \times 10^{23} \text{ atoms}}{\text{mol}} = 6.02 \times 10^{23} \text{ atoms C}$$

How many molecules of carbon dioxide in 1 mol of carbon dioxide?

$$\text{Molecules CO}_2 = 1 \text{ mol CO}_2 \times \frac{6.02 \times 10^{23} \text{ molecules}}{\text{mol}} = 6.02 \times 10^{23} \text{ molecules CO}_2$$

How many atoms of oxygen in 1 mol of carbon dioxide? $\text{molecule} = \text{molec}$ Short form

$$\text{Atoms O} = 1 \text{ mol CO}_2 \times \frac{6.02 \times 10^{23} \text{ molecules}}{\text{mol}} \times \frac{2 \text{ atoms O}}{1 \text{ molecule CO}_2} = 1.204 \times 10^{24} \text{ atoms O}$$

How many moles in 5 molecules of carbon dioxide? $5 \div 6.02E23 = 8.31E - 24$ Calculator

$$\text{mol CO}_2 = 5 \text{ molecules CO}_2 \times \frac{\text{mol}}{6.02 \times 10^{23} \text{ molecule}} = 8.31 \times 10^{-24} \text{ mol CO}_2$$

How many atoms of oxygen in 50 g of oxygen gas?

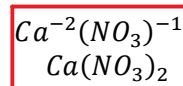
$$\text{atoms O}_2 = 50 \text{ g O}_2 \times \frac{1 \text{ mol}}{16 \text{ g}} \times \frac{6.02 \times 10^{23} \text{ molecules}}{\text{mol}} \times \frac{2 \text{ atoms O}}{1 \text{ molecule O}} = 1.88 \times 10^{24} \text{ atoms O}_2$$

What is the mass of 3.18×10^{24} atoms of sodium?

$$\text{mass Na} = 3.18 \times 10^{24} \text{ atoms Na} \times \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ atoms}} \times \frac{23 \text{ g}}{\text{mol}} = 121.49 \text{ g Na}$$

How many atoms in one mole of calcium nitrate?

$$\text{atoms} = 1 \text{ mol Ca(NO}_3)_2 \times \frac{6.02 \times 10^{23} \text{ molecules}}{1 \text{ mol Ca(NO}_3)_2} \times \frac{9 \text{ atoms}}{1 \text{ Ca(NO}_3)_2 \text{ molecule}} = 5.418 \times 10^{24} \text{ atoms}$$



Find the mass of 2 molecules of water H₂O.

$$\text{mass H}_2\text{O} = 2 \text{ molecules H}_2\text{O} \times \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ molecules}} \times \frac{18 \text{ g}}{\text{mol}} = 5.98 \times 10^{-23} \text{ g H}_2\text{O}$$

Find the number of molecules in 48 g of CH₄.

$$\text{molecules CH}_4 = 48 \text{ g CH}_4 \times \frac{\text{mol}}{16 \text{ g}} = \frac{6.02 \times 10^{23} \text{ molecules}}{\text{mol}} = 1.806 \times 10^{24} \text{ molecules CH}_4$$

How many atoms in 80 g CO₂?

$$\text{atoms CO}_2 = 80 \text{ g CO}_2 \times \frac{1 \text{ mol}}{44 \text{ g}} \times \frac{6.02 \times 10^{23} \text{ molecules}}{\text{mol}} \times \frac{3 \text{ atoms}}{\text{molecule}} = 3.28 \times 10^{24} \text{ atoms CO}_2$$

What is the mass of hydrogen in 3.24 × 10²⁴ molecules of H₂O?

$$\text{g H} = 3.24 \times 10^{24} \text{ molecules H}_2\text{O} \times \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ molecules H}_2\text{O}} = 5.38 \text{ mol H}_2\text{O}$$

What is the mass of hydrogen in 5.38 moles of H₂O?

$$5.38 \text{ mol H}_2\text{O} \times \frac{2(1 \text{ g})}{\text{mol}} = 10.76 \text{ g H} \quad \text{OR} \quad 5.38 \text{ mol H}_2\text{O} \times \frac{2 \text{ mol H}}{\text{mol H}_2\text{O}} \times \frac{1 \text{ g}}{\text{mol}} = 10.76 \text{ g H} \quad \frac{\text{mol (s)}}{\text{mol (s)}}$$