

Atomic Mass and Molar Mass Conversions and Stoichiometry

1. Calculate the molecular mass of ibuprofen $C_{13}H_{18}O_2$

Number of atoms C _____ H _____ O _____

Atomic mass of C _____ amu H _____ amu O _____ amu

2. Calculate the formula weight of $Al_2(SO_4)_3$.

Number of atoms Al _____ S _____ O _____

Atomic mass of Al _____ amu S _____ amu O _____ amu

3. How many molecules of oxygen (O_2) are present in a 0.250 mol sample of the gas?

Given: _____ Desired _____

Equivalences:

Conversion factors

Setup:

4. I have 2.61×10^{23} C atoms. How many moles is this? How many grams?

Given units _____ desired units _____

Equivalences

Roadmap

Conversion factors

Setup:

5. Calculate the molar mass of NH₃.

What is the mass in grams of 0.25 mol NH₃?

Given: Desired: Equivalence:

Conversion Factors

Setup:

How many moles NH₃ are in 25.0 g?

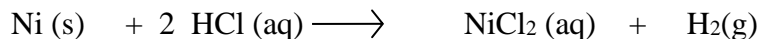
Given: Desired: Equivalence:

Setup:

6. How many moles of aspirin (C₉H₈O₄) are in a 350 mg tablet?

7. How many moles of sodium hydrogen phosphate are in 2.8 g? How many moles of Na⁺ ions?
How many moles of HPO₄²⁻ ions?

8. Consider the following reaction:



ALWAYS make sure equation is balanced!!!!!!!!!!!!

a) How many moles of nickel will react with 2.40 moles HCl?

Mole ratios: $\frac{1 \text{ mol Ni}}{2 \text{ mol HCl}}$ and $\frac{2 \text{ mol HCl}}{1 \text{ mol Ni}}$

Setup: 2.40 mol HCl x _____ =

b) How many moles of NiCl₂ are formed if 3.2 moles of HCl are reacted?

Mole ratios: _____ and _____

Setup: 3.2 mol HCl x _____ =

c) How many grams of NiCl₂ are produced for every 2.60 mol of Ni reacted?

Mole ratios: _____ and _____

Equivalence: 1 mol NiCl₂ = 126.9 g

Additional Conversion factors _____ and _____

Setup: 2.60 mol Ni x _____ x _____

d) How many grams of HCl is needed to produce 0.6678 g H₂ gas?

Mole ratios: _____ and _____

Equivalences: 1 mol HCl = 36.460 g and 1 mole H₂ = 2.016 g

Additional Conversion Factors:

Setup: 0.6778 g H₂ x _____ x _____ x _____ =

e) Using the information obtained from part c, what is the percent yield if in an experiment 322 g of NiCl₂ was recovered?

% yield = $\frac{\text{actual yield, g}}{\text{theoretical yield, g}} \times 100 \%$

theoretical yield _____ actual yield _____

calculation: