Today's Lecture

- ✓Announcements
- ✓Quiz
- ✓More Avogadro's Number and Mole
- ✓Quantitative Information from balanced Equations

Announcements

- Office hours
  - Mon, Wed, 11:30-12:30 am
  - Sun,Tue,Thu 11:00-12:00 pm
- Reading
  - Chapter 3, Sections **(3.4),(3.6)** and (3.7)
- Suggested Problems
- 3.27,3.293.31,3.33, 3.35, 3.37,3.39,3.41,3.573.59, 3.61, 3.63,3.67,3.69, 3.71,3.73,3.77

Sample Exercise 3.10 Converting Grams to Moles

Calculate the number of moles of glucose ($C_6H_{12}O_6$) in 5.380 g of $C_6H_{12}O_6$.

Practice Exercise

How many moles of sodium bicarbonate ($NaHCO_3$) are in 508 g of $NaHCO_3$?

Sample Exercise 3.11 Converting Moles to Grams

Calculate the mass, in grams, of 0.433 mol of calcium nitrate.

Practice Exercise

What is the mass, in grams, of **(a)** 6.33 mol of $NaHCO_3$ and **(b)** 3.0×10^{-5} mol of sulfuric acid?

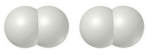
Sample Exercise 3.12 Calculating the Number of Molecules and Number of Atoms from Mass

(a) How many glucose molecules are in 5.23 g of $C_6H_{12}O_6$? **(b)** How many oxygen atoms are in this sample?

Practice Exercise

(a) How many nitric acid molecules are in 4.20 g of HNO_3?
(b) How many O atoms are in this sample?

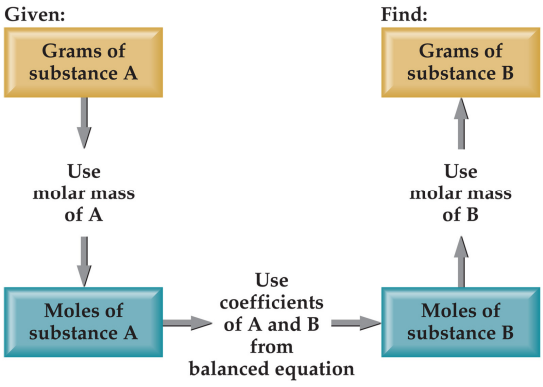
Stoichiometric Calculations

Equation:	$2\ H_2(g)$	+	$O_2(g)$	⟶	$2\ H_2O(l)$
Molecules:	2 molecules H_2	+	1 molecule O_2	⟶	2 molecules H_2O
					
Mass (amu):	4.0 amu H_2	+	32.0 amu O_2	⟶	36.0 amu H_2O
Amount (mol):	2 mol H_2	+	1 mol O_2	⟶	2 mol H_2O
Mass (g):	4.0 g H_2	+	32.0 g O_2	⟶	36.0 g H_2O

The coefficients in the balanced equation give the ratio of *moles* of reactants and products.

Stoichiometric Calculations

Starting with the mass of Substance A you can use the ratio of the coefficients of A and B to calculate the mass of Substance B formed (if it's a product) or used (if it's a reactant).



Stoichiometric Calculations

$C_6H_{12}O_6 + 6\ O_2 \rightarrow 6\ CO_2 + 6\ H_2O$

1.00 g $C_6H_{12}O_6$

Starting with 1.00 g of $C_6H_{12}O_6$…
we calculate the moles of $C_6H_{12}O_6$…
use the coefficients to find the moles of H_2O…
and then turn the moles of water to grams.

Sample Exercise 3.16 Calculating Amounts of Reactants and Products

How many grams of water are produced in the oxidation of 1.00 g of glucose, $C_6H_{12}O_6$?

$C_6H_{12}O_6(s) + 6\ O_2(g) \rightarrow 6\ CO_2(g) + 6\ H_2O(l)$

Practice Exercise

The decomposition of $KClO_3$ is commonly used to prepare small amounts of O_2 in the laboratory:
$2\ KClO_3(s) \rightarrow 2\ KCl(s) + 3\ O_2(g)$. How many grams of O_2 can be prepared from 4.50 g of $KClO_3$?

Next Lecture

- Limiting Reactants
  Chapter 3, Section 3.7