Unit 7 Notes

The Mole: A Measurement of Matter

Mole

* SI unit that measures the amount of substance
* 1 mole of a substance = 6.02 x 1023 representative particles of that substance

Avogadro’s number = 6.02 x 1023

Molar Mass

* Atomic mass of an element or compound expressed in grams
* Round the atomic mass to one place after the decimal point

Ex: H = SO3 =

 O2 = CaSO4 =

 H2O = CuI2 =

Molar Map

Moles/Grams Conversions

1 mol of any substance = the molar mass of that substance

Ex: How many grams in 19.9 moles of ammonia (NH3)?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ =

Ex: How many moles are in 718 g of dinitrogen trioxide?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ =

Moles/Volume Conversions

* Measured at standard temperature & pressure (STP)

 T= 0˚C or 273 K

 P= 101.3 kPa or 1 atm

1 mol of a gas = 22.4 L of any gas at STP

Ex: How many liters are in 0.536 moles of oxygen gas at STP?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ =

Ex: How many moles are in 67.2 L of sulfur dioxide?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ =

Moles/Representative Particles Conversions

* Species present in a substance
* Molecules or formula units

Ex: How many moles are in 1.50 x 1025 molecules of NH3?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ =

Ex: How many molecules are in 1.5 moles of helium?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ =

Moles/Atoms Conversions

* To determine the number of atoms in a mole of a compound, you must determine the number of atoms in a representative particle of that compound.

Ex: How many atoms are in 2.12 moles of propane?

 1 mole C3H8 = 6.02 x 1023 molecules C3H8

 1 molecule C3H8 = 11 atoms of C3H8

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ =

Ex: How many moles are in 4.81 x 1024 atoms of Li?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ =