Molar Mass of ionic compounds

Molar Mass

- Molar mass- same as atomic mass but for a compound rather than an atom.
- To determine the molar mass of any compound you add up the atomic mass of all atoms present.
- NaCl
- 22.99 + 35.45 = 58.44 g/mol (amu)

Molar mass with subscript numbers

- Subscript numbers mean there are that many of that atom.
- CaI_2
- 40.08 + 126.9 + 126.9 =
- or you can multiply
- 40.08 + 126.9 x 2 =
- = 293.88 g/mol (amu)

Molar Mass with parentheses

- Parentheses and a subscript number mean there are that many of everything in the parentheses
- $Be(OH)_2$
- 9.012 + (16.00 + 1.008) x 2 =
- 9.012 + (17.008) x 2 =
- 9.012 + 34.016 = 43.028 g/mol

Combining all of them

- $(NH_4)_2CO_3$
- (14.01 + 1.008 x 4) x 2 + 12.01 + 16.00 x 3
- (14.01 + 4.032) x 2 + 12.01 + 48
- (18.042) x 2 + 60.01
- 36.084 + 60.01
- =96.094 g/mol

Converting between moles and grams using molar mass

Converting between moles and grams

- molar mass is the conversion factor
- that many grams equal one mole of the substance!
- so convert 64 g of NaCl into moles
- $64\ g\ NaCl \times \frac{1\ mole\ NaCl}{58.44\ g\ NaCl} = 1.1\ mol\ NaCl$

Practice problem

- How many grams are in 1.4 mol of potassium arsenate?
- K_3AsO_4
- =256.22 g/mol
- $1.4\ mol \times \frac{256.22\ g}{1\ mole}$
- =360 g K_3AsO_4

Another Problem

- How many moles are in 54 g of chromium (III) carbonate?
- $Cr_2(CO_3)_3$
- 284.03 g/mol
- $54\ g \times \frac{1\ mole}{284.03\ g}$
- =0.19 mol $Cr_2(CO_3)_3$