STOICHIOMETRY: GRAMS TO GRAMS NOTES

Vocabulary:

Stoichiometry- Greek,"stoiechion" meaning "element," and "metron" meaning "to measure.” The process of calculating substance quantities in a reaction using the balanced equation.

Balanced Equation- An equation that upholds mass conservation and equal element counts on both sides of an equation.

Coefficient- a whole number put before a formula in a chemical equation to achieve equilibrium.

Conversion factor- a numeric ratio of equal measurements used to convert quantities between different units.

Moles(mol)- the quantity of an element or compound containing 6.02×10^{23}(Avagadro’s number) particles (ex. atoms, ions, etc.) of that element/compound.

Molar (Molecular) Mass-the weight (in grams) of a single mole of particles (atoms, ions, or molecules) of an element/compound.

Steps:

1. Balance the equation.
2. Convert grams A given in the problem to moles of A by dividing by the molar(molecular) mass of A from the periodic table.
3. Determine the mole to mole ratio between A and B.
4. Convert moles of B to the mass of B by multiplying the molecular mass of B.
5. Multiply across, divide bottom.

 # g A

# g A	*# mol A*	*Ratio from coefficient mol B*	*Molar mass from periodic table g B*	*= grams of B*
	Molar mass from periodic table g A	*Ratio from coefficient mol A*		

ketzbook's Stoichiometry Tricks Video:

Problem: How many grams of carbon dioxide are produced when 2800 grams of octane are burned in excess air?

1. Balance reaction:
   $2C_4H_{18} + 25O_2 \rightarrow 16CO_2 + 18H_2O$
2. Mass of A(C_4H_{18}) given: *2800 g C_4H_{18}*
3. Molar mass of A(C_4H_{18}): *114.2 g C_4H_{18}*
4. Mole to mole ratio of A and B: *2 mol of A to 16 mol of B (2:16)*
5. Molar Mass of B(CO_2): *44.01g*
6. Use the given information to solve the problem:

2800 g C_4H_{18}	*1 mol C_4H_{18}*	*16 mol CO_2*	*44.01 g*
	114.2 g C_4H_{18}	*2 mol C_4H_{18}*	*1 mol CO_2*

7. Answer: *8,632.43g CO_2*

Practice Problem:

Problem: If 14 grams of H_2 and excess O_2 react to produce water. How many grams of H_2O are produced?

1. Balance the equation:

   $2H_2 + 1\ O_2 \rightarrow 2H_2O$
2. Mass A given: *14 g H_2*
3. Molar mass of A: *2.02 g H_2*
4. Mole to mole ratio of A and B: *2:2*
5. Molar Mass of B(CO_2): *18.02 g H_2O*
6. Using the given information to solve the problem:

14 g H2	*1 mol H_2*	*2 mol H_2O*	*18.02 g H_2O*
	2.02 g H_2	*2 mol H_2*	*1 mol H_2O*

7. Answer: *124.89 g H_2O*

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