Chemistry Crib Sheet: Topic 3

ATOMS CAN NEVER BE CREATED OR DESTROYED

Law of conservation of mass

zinc + oxygen ⚖ zinc oxide
● oxygen ○ zinc

total mass of reactants = total mass of products
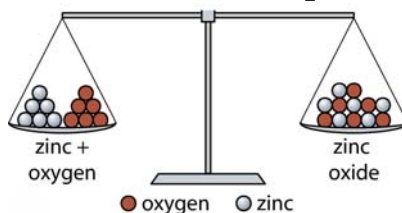
Percentage mass of an element in a compound $= \dfrac{A_r \times \text{number of atoms of that element}}{M_r \text{ of the compound}} \times 100$

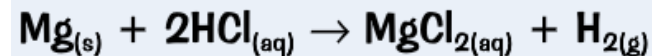Carbon has an A_r of 12.   So one mole of carbon weighs exactly 12 g.
Nitrogen gas, N_2, has an M_r of 28 (2 × 14).   So one mole of N_2 weighs exactly 28 g.
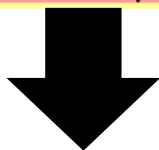Carbon dioxide, CO_2, has an M_r of 44 (12 + [2 × 16]).   So one mole of CO_2 weighs exactly 44 g.

Number of moles $= \dfrac{\text{mass in g (of an element or compound)}}{M_r \text{ (of the element or compound)}}$

$$Mg_{(s)} + 2HCl_{(aq)} \rightarrow MgCl_{2(aq)} + H_{2(g)}$$

In this reaction, 1 mole of magnesium and 2 moles of hydrochloric acid react together to form 1 mole of magnesium chloride and 1 mole of hydrogen gas.

If the Mass Seems to Change, There's Usually a Gas Involved

Mass increase

Mass decrease

One of the reactants is a gas that is found in the air (e.g. oxygen) and all the products are solids, liquids or aqueous.

One of the products is a gas and all the reactants are solids, liquids or aqueous.

Reactions Stop When One Reactant is Used Up

A reaction stops when all of one of the reactants is used up. The reactant that is used up in a reaction is called the limiting reactant (because it limits the amount of product that is formed).

One way to measure the concentration of a solution is by calculating the mass of a substance in a given volume of solution. The units will be units of mass/units of volume. Here's how to calculate the concentration of a solution in g/dm^3:

in g/dm^3 concentration $= \dfrac{\text{mass of solute}}{\text{volume of solvent}}$ in g   in dm^3