Stoichiometry

from the Greek word, "stoiken" - meaning element

definition - the relationship between the relative amounts of substances (reactants & products) taking part in a reaction, typically a ratio of whole integers.

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mole ratio — comes from the balanced equation

Balance the equation:

$1\ N_2(g) + 3\ H_2(g) \rightarrow 2\ NH_3(g)$

1 mol N_2 + 3 mol H_2 → 2 mol NH_3

3 mol N_2 + 9 mol H_2 → 6 mol NH_3

.5 mol N_2 + 1.5 mol H_2 → 1 mol NH_3

mole Ratio $\left(\frac{\text{mol unknown}}{\text{mol given}}\right)$ → used to convert b/w one substace & another

Ex)

$16\ Fe(s) + 3\ S_8(s) \rightarrow 8\ Fe_2S_3(s)$

(1) How many (moles of iron (III) sulfide) are produced from the reaction of 6.00 mol iron (GIVEN) with excess sulfur?

$$6.00\ \text{mol Fe} \left| \frac{8\ \text{mol } Fe_2S_3}{16\ \text{mol Fe}} \right. = 3.00\ \text{mol } Fe_2S_3$$

(2) How many (moles of iron (III) sulfide) are produced from the reaction of .565 mol sulfur (GIVEN) with excess iron?

$$.565\ \text{mol } S_8 \left| \frac{8\ \text{mol } Fe_2S_3}{3\ \text{mol } S_8} \right. = 1.51\ \text{mol } Fe_2S_3$$