Question 14

A side reaction in the manufacture of rayon from wood pulp is

$$3CS_2 + 6NaOH \rightarrow 2Na_2CS_3 + Na_2CO_3 + 3H_2O$$

How many grams of Na_2CS_3 are produced in the reaction between 92.5 mL of liquid CS_2 and 2.78 mol NaOH?

(Given *density of* $CS_2 = 1.26\ g/mL$)

Density = Mass solution ,g / Volume solution, mL

Mass of CS_2 = Density x Vol solution

= _____ g

Mol of CS_2 = _____ g / g/mole

= _____ mole

Ar of Na = 23

Ar of O = 16

Ar of H = 1

Ar of C = 12

Ar of S = 32

Mol of NaOH = 2.78mole

Mole of product formed based on LR!!

There are **3 methods** to determine the LR:

1) Compare mole ratios of the reactants

2) Compare the amount of products based on different reactants

3) Compare the mole needed vs mole required



Lets say we use **mole ratio of the reactants** to determine the LR

Compare the mole ratio of the reactants

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$$3CS_2 + 6NaOH \rightarrow 2Na_2CS_3 + Na_2CO_3 + 3H_2O$$

Mole ratio of CS_2 = $\frac{\text{mol of } CS_2}{\text{S. Coefficient } CS_2}$ = _____ =

Mole ratio of NaOH = $\frac{\text{mol of NaOH}}{\text{S. Coefficient NaOH}}$ = _____ =

Mole ratio of CS_2 _____ mole ratio of NaOH

Limiting reactant is _____

From balanced equation

6 moles of NaOH produces 2 moles Na_2CS_3

6 moles NaOH = 2 moles Na_2CS_3

_____mol NaOH = ___ x _____ mol Na_2CS_3

= _____ moles Na_2CS_3

Mole Na_2CS_3 = $\frac{\text{mass } Na_2CS_3}{\text{molecular mass } Na_2CS_3}$

mass Na_2CS_3 = _____g

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