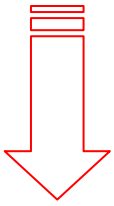
STOICHIOMETRY : LIMITING REACTANT

REVIEW QUESTIONS

Q3.

When 2.50 mol of carbon is burned in a closed vessel with 20.00 g of oxygen, how many grams of carbon dioxide can form? What mass of the excess reactant remains?

ANSWER



Answer Q3 :

$$C(s) + O_2(g) \longrightarrow CO_2(g)$$

2.50 mols 20.0 g ? g

$M_r(C) = 12.011\ g\,mol^{-1}$

$M_r(O_2) = 31.998\ g\,mol^{-1}$

$M_r(CO_2) = 44.01\ g\,mol^{-1}$

$n_C = 2.50\ mols = 30.03\ g$

$n_{O_2} = \left(\frac{20.0}{31.998}\right) mols = 0.625\ mols$

$\frac{n_C}{1} = \frac{2.50}{1} = 2.50$

$\frac{n_{O_2}}{1} = \frac{0.625}{1} = 0.625$ ← smallest value

$\therefore O_2$ = limiting reactant

$n_{CO_2} = n_{O_2}$

$\frac{m_{CO_2}}{44.01} = 0.625\ mols \Rightarrow m_{CO_2} = (0.625)(44.01)$

$= \underline{27.51\ g\ (Ans)}$

$n_C = n_{O_2} = 0.625\ mols$

$\left(\frac{m_C}{12.011}\right) = 0.625 \Rightarrow m_C = (0.625)(12.011)$

$= 7.51\ g$

$\therefore$ Excess carbon remains $= (30.03 - 7.51)\ g$

$= \underline{22.52\ g\ (Ans)}$

Prepared by
V.Manoharan
vmano@usm.my
manovv1955@yahoo.com
04-6533888 ext 3566