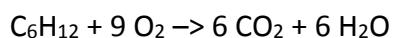


Answer on Question #43459 - Chemistry - Inorganic Chemistry

Question:

Consider the reaction



How many grams of O_2 are consumed when C_6H_{12} is burned to yield 2.5 grams of CO_2 ?

Give your answer in 1 decimal.

Solution:

Number of moles of CO_2 is calculated as

$$n_{\text{CO}_2} = \frac{m_{\text{CO}_2}}{M_{\text{CO}_2}} = \frac{2.5 \text{ g}}{44.0 \text{ g/mol}} = 0.057 \text{ mol}$$

where M_{CO_2} – molar weight of CO_2 .

As is clear from the reaction stoichiometry, **9** moles of O_2 are consumed to yield **6** moles of CO_2 . Having calculated the actual number of moles of CO_2 we can write down the proportion:

6 mol (CO_2) – 9 mol (O_2)

0.057 mol (CO_2) – n_{O_2} mol (O_2),

whence

$$n_{\text{O}_2} = \frac{0.057 \cdot 9}{6} = 0.085 \text{ mol}$$

Mass of O_2 consumed is

$$m_{\text{O}_2} = n_{\text{O}_2} \cdot M_{\text{O}_2} = 0.085 \cdot 32.0 = 2.7 \text{ g}$$

where M_{O_2} – molar weight of O_2 .

Answer: 2.7 g