

Answer on Question #80337, Chemistry/ Organic Chemistry

Liquid hexane

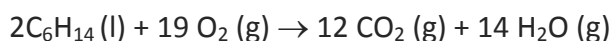
will react with gaseous oxygen

to produce gaseous carbon dioxide

and gaseous water

. Suppose 13.8 g of hexane is mixed with 74. g of oxygen. Calculate the minimum mass of hexane that could be left over by the chemical reaction. Round your answer to significant digits.

Solution



1. Find amount of substance of hexane:

$$n = m/M$$

$$M(\text{C}_6\text{H}_{14}) = 86 \text{ g/mol}$$

$$n(\text{C}_6\text{H}_{14}) = 13.8 \text{ g} / 86 \text{ g/mol} = 0.160 \text{ mol}$$

2. Find amount of substance of oxygen

$$n = m/M$$

$$M(\text{O}_2) = 32 \text{ g/mol}$$

$$n(\text{O}_2) = 74. \text{ g} / 32 \text{ g/mol} = 2.31 \text{ mol}$$

3. Find limiting reactant.

According to equation mole ratio of reactants is:

$$n(\text{C}_6\text{H}_{14}):n(\text{O}_2) = 2:19.$$

If we have 0.160 mol of hexane then amount of substance of oxygen should be:

$$n(\text{O}_2) = 0.160 \times 19/2 = 1.52 \text{ mol. And we have } n(\text{O}_2) = 2.31 \text{ mol. We have excess of}$$

oxygen. Limiting reactant is hexane. This means, that all hexane (13.8 g) will be consumed in this reaction. No hexane could be left over.

Answer: all hexane (13.8 g) will be consumed in this reaction, no hexane could be left over.