Answer on Question #40484, Chemistry, Other

Question

Balance the following combustion reaction in order to answer the following questions. Use lowest whole-number coefficients.

$C_2H_4 + O_2 \rightarrow CO_2 + H_2O$

You are given 7.5 moles of O_2 to react with 1.80×10^2 g C_2H_4. Upon completion of the reaction, will there be any remaining C_2H_4?

Answer

$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$

Stoichiometric ratio: $n(O_2)/n(C_2H_4) = 3$.

Quantity of C_2H_4:

$M(C_2H_4) = 28$ g/mol

$n(C_2H_4) = 1.80 \times 10^2$ g / 28 g/mol = 6.42 mol

Given ratio:

$n(O_2)/n(C_2H_4) = 7.5/6.42 = 1.17$.

Given ratio is lesser than the stoichiometric ratio, hence C_2H_4 is in excess (there is not enough O_2 to combust all the C_2H_4) and will remain upon completion of the reaction.