

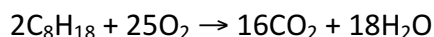
Answer on the question #59540, Chemistry / General Chemistry

Question:

Find the amount of carbon dioxide released into the air when 32.5 g. of octane is completely combusted with oxygen also What is the volume of this carbon dioxide gas at STP?

Solution:

The reaction of combustion of octane is:



Then, moles of carbon dioxide and octane relate as:

$$n(C_8H_{18}) = \frac{n(CO_2)}{8}$$

The number of the moles of octane can be calculated through molar mass $M(C_8H_{18})$:

$$n(C_8H_{18}) = \frac{m(C_8H_{18})}{M(C_8H_{18})} = \frac{32.5(g)}{114.23(g/mol)} = 0.285 \text{ mol}$$

Then, amount of carbon dioxide is:

$$n(CO_2) = 0.285 \cdot 8 = 2.276 \text{ mol}$$

And, finally, the volume of carbon dioxide (number of the moles times molar volume V_M):

$$V(CO_2) = n(CO_2) \cdot V_M = 2.276(mol) \cdot 22.4(L/mol) = 51L$$

Answer: 2.28 mol, 51 L