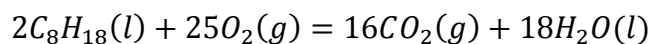


Answer on Question #70650 - Chemistry - General Chemistry

Question: The combustion of hydrocarbons is used in many areas of life, from cooking to heating to manufacturing. Octane is a medium sized liquid fuel molecule. It will burn according to the unbalanced chemical reaction: $C_8H_{18}(l) + O_2(g) = CO_2(g) + H_2O(l)$. Suppose you are given 1.00 liter of octane (density = 0.703 g/cm^3). How many grams of carbon dioxide will be produced?

Solution

1) write the balanced chemical equation of the octane combustion:



2) calculate the mass of octane:

$$m(C_8H_{18}) = V(C_8H_{18}) * \rho(C_8H_{18}) = 1000 * 0.703 = 703 \text{ g.}$$

3) calculate the mass of carbon dioxide from the balanced reaction equation using the molar masses of octane and carbon dioxide ($M(C_8H_{18}) = 114 \text{ g/mol}$, $M(CO_2) = 44 \text{ g/mol}$):

$$m(CO_2) = \frac{m(C_8H_{18}) * 16M(CO_2)}{2M(C_8H_{18})} = \frac{703 * 16 * 44}{2 * 114} \approx 2170.67 \text{ g.}$$

Answer: the mass of carbon dioxide is 2170.67 g.

Answer provided by <https://www.AssignmentExpert.com>