Use the balanced chemical reaction for the combustion of propane, C_3H_8, to answer the questions below.

$$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$$
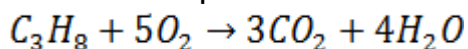
A) A student conducts an experiment using the reaction above. When she burns 44.0 grams of propane, 160.0 grams of oxygen is consumed, 132 grams of carbon dioxide and 72 grams of water are produced. Does this data support the Conservation of Mass? How are these masses related to the coefficients in the balanced reaction? Use the masses given to support both of your answers.

Solution:

According to the Conversation of Mass:

$$m(C_3H_8) + m(O_2) = m(CO_2) + m(H_2O)$$
$$44.0 + 160.0 = 132 + 72$$

This data support the Law.

If we calculate the moles of each component, we can see the next relation:

$$n(C_3H_8) = \frac{44.0}{44.0} = 1 \ (mol)$$

$$n(O_2) = \frac{160.0}{32.0} = 5 \ (mol)$$

$$n(CO_2) = \frac{132}{44} = 3 \ (mol)$$

$$n(H_2O) = \frac{72}{18} = 4 \ (mol)$$

The number of moles is related to their coefficients.

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