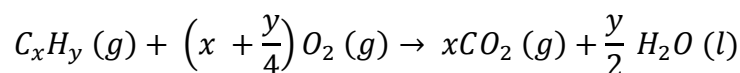


Answer on Question #68930, Physics / Other

A certain quantity of a gaseous hydrocarbon burned with a certain quantity of oxygen gas. The volume of all reactants is 600ml. After the burning the volume of CO₂ and H₂O is found 700ml in the same position. What is the molecular formula of compound?

Solution:

Hydrocarbons burns in excess oxygen based on the following equation:



Hence, if 1cm³ of is completely burned in oxygen,

Volume of oxygen used = $(x + y/4)$ cm³

Volume of carbon dioxide produced = x cm³

Volume of water produced (as liquid) = $y/2$ cm³

Hence, we can directly take out the ratio of moles that reacted:

$$\begin{cases} 1 + x + \frac{y}{4} = 6 \\ x + \frac{y}{2} = 7 \end{cases}$$
$$\begin{cases} x + \frac{y}{4} = 5 \\ x + \frac{y}{2} = 7 \end{cases}$$

From first equation

$$x = 5 - \frac{y}{4}$$

Substituting to second equation

$$5 - \frac{y}{4} + \frac{y}{2} = 7$$

$$\frac{y}{4} = 2$$

$$y = 8$$

$$x = 5 - \frac{y}{4} = 5 - 2 = 3$$

Hence, the molecular formula of the hydrocarbon is C₃H₈.

Answer: C₃H₈

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