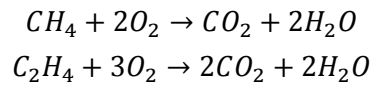


Answer on Question #68940-Physics-Other

10gram of a natural gas contains CH₄ and C₂H₄ is burned in the presence of oxygen and get some water and 29gram CO₂.howmuch gram of water made?

Solution



Let x be the mass of CH₄.

$$\begin{aligned}n(CH_4) &= \frac{x}{16} \text{ mol.} \\n(C_2H_4) &= \frac{10-x}{28} \text{ mol.}\end{aligned}$$

Number of moles of CO₂ from CH₄ is $\frac{x}{16}$ mol.

Number of moles of CO₂ from C₂H₄ is

$$2\left(\frac{10-x}{28}\right) = \frac{10-x}{14} \text{ mol.}$$

Thus,

$$n(CO_2) = \frac{x}{16} + \frac{10-x}{14} = \frac{160-2x}{224} \text{ mol.}$$

Also

$$n(CO_2) = \frac{29}{44.0} = 0.659 \text{ mol.}$$

So,

$$\begin{aligned}\frac{160-2x}{224} &= 0.659 \\x &= 6.19 \text{ g.}\end{aligned}$$

The mass of water from CH₄ is

$$6.19 \text{ g} \left(\frac{1}{16 \frac{\text{g}}{\text{mol}}} \right) (2) \left(18 \frac{\text{g}}{\text{mol}} \right) = 13.93 \text{ g.}$$

The mass of water from C₂H₄ is

$$(10 \text{ g} - 6.19 \text{ g}) \left(\frac{1}{28 \frac{\text{g}}{\text{mol}}} \right) (2) \left(18 \frac{\text{g}}{\text{mol}} \right) = 4.90 \text{ g.}$$

Total mass of water is

$$13.93 + 4.90 = 18.83 \text{ g.}$$