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

$$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$$
$$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$$

Let x be the mass of CH_4.

$$n(CH_4) = \frac{x}{16} mol.$$
$$n(C_2H_4) = \frac{10-x}{28} mol.$$

Number of moles of CO_2 from CH_4 is $\frac{x}{16} mol.$

Number of moles of CO_2 from C_2H_4 is

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

Thus,

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

Also

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

So,

$$\frac{160-2x}{224} = 0.659$$
$$x = 6.19\ g.$$

The mass of water from $CH_4\ is$

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

The mass of water from $C_2H_4\ is$

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

Total mass of water is

$$13.93 + 4.90 = 18.83\ g.$$