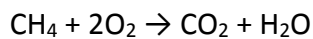


Question #77058 - Chemistry - General Chemistry

If 5 moles of methane were burned in excess oxygen what volume of carbon dioxide would be produced assuming room temperature and pressure?

Solution



From the equation for a reaction, we can tell how many moles of a CO_2 will produce use $\text{CH}_4:\text{CO}_2$ molar ratio:

1 is to 1 as 5 mol is to x

x = 5 mol of CO_2 produced

In this problem, I am taking room temperature to be $25.0\text{ }^\circ\text{C} = 298\text{ K}$

Use $PV = nRT$ to determine volume of CO_2 :

$R = 0.08206\text{ L}\cdot\text{atm}\cdot\text{mol}^{-1}\cdot\text{K}^{-1}$ (universal gas constant)

$P = 1\text{ atm}$

$$V(\text{CO}_2) = (n(\text{CO}_2) \times R \times T) / P$$

$$V(\text{CO}_2) = (5 \times 0.08206 \times 298) / 1 = 122.27\text{ L}$$

Answer

Volume of carbon dioxide would be produced assuming room temperature and pressure = 122.27 L.