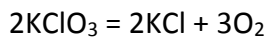


Question #63964, Chemistry / General chemistry

A sample of KClO_3 was heated to decompose it to potassium chloride and oxygen. The O_2 was collected over water at 294K and a barometric pressure of 746mmHg. A 155-ml volume of the gaseous mixture was obtained. What mass of KClO_3 was decomposed?

Solution



$$pV/T = p_1V_1/T_1$$

$$V_1 = p \cdot V \cdot T_1 / p_1 \cdot T = 746 \cdot 0.155 \cdot 273 / 746 \cdot 294 = 0.144 \text{ (L)}$$

$$n(\text{O}_2) = V/V_m = 0.144 / 22.4 = 0.0064 \text{ (mol)}$$

$$n(\text{KClO}_3) = 2/3 \cdot n(\text{O}_2) = 0.00427 \text{ (mol)}$$

$$m(\text{KClO}_3) = n \cdot M = 0.00427 \cdot (39 + 35.5 + 16 \cdot 3) = 0.52 \text{ (g)}$$

Answer

$$m(\text{KClO}_3) = 0.52 \text{ g}$$