

Answer on Question #75956 - Chemistry - General Chemistry

Question: A 37.7 mL gas sample is collected over water at 19 degree Celsius and a total pressure of 770 Torr. The mass of the gas is measured to be 68.6 mg.

A) How many moles of gas are collected? (SHOW ALL WORK)

B) What is the molar mass of this gas? (SHOW ALL WORK)

Solution:

A) $V = 37.7 \text{ mL} = 0.037 \text{ L} = 3.77 \cdot 10^{-5} \text{ m}^3$;

$T = 19 \text{ C} = 292.15 \text{ K}$;

$P = 770 \text{ Torr} = 102658 \text{ Pa}$;

$R = 8.314 \text{ J}/(\text{K}\cdot\text{mol})$;

$PV = nRT$

$n = PV/RT = (102658 \cdot 3.77 \cdot 10^{-5}) / (8.314 \cdot 292.15) = 0.0016 \text{ mol}$.

B) $n = m/M$

$M = m/n = 68.6 / 0.0016 = 42875 \text{ g/mol}$

Answer: A) 0.0016 mol;

B) 42875 g/mol.

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