

Answer on Question #72931 – Chemistry – General chemistry

Question:

If 2.4g of a colourless gas Q occupies 1.68dm³ at S.T.P. Calculate the relative molar mass

Solution:

To calculate the relative molar mass of a colourless gas we have to use two equations. At first, we need to calculate the number of moles in 1.68 dm³, using constant value of molar volume V_m equal to 22.4 dm³/mol (the volume of 1 mol of gaseous compound):

$$n = \frac{V}{V_m}$$
$$n = \frac{1.68 \text{ dm}^3}{22.4 \text{ dm}^3/\text{mol}} = 0.075 \text{ mol}$$

When we know the mol number and mass of compound, we can calculate the relative molar mass:

$$M = \frac{m}{n}$$
$$M = \frac{2.4 \text{ g}}{0.075 \text{ mol}} = 32 \frac{\text{g}}{\text{mol}}$$

Answer: the relative molar mass of colourless gas equal to 32 g/mol