

Task:

How many grams would 3.37×10^{22} atoms of sulfur be?

Solution:

According to Avogadro Law: 1 mol of substance contains $6.02 \cdot 10^{23}$ atoms (molecules, ions).

$$n(\text{mol}) = N / N_A$$

n – the amount of sulfur (mol)

N – the quantity of atoms of sulfur

N_A – Avogadro constant ($6.02 \cdot 10^{23}$)

$$n(\text{mol}) = m(\text{g}) / \text{MW} (\text{g/mol})$$

$$m(\text{g}) / \text{MW} (\text{g/mol}) = N / N_A$$

$\text{MW}(\text{S}) = 32 \text{ g/mol}$ (from the periodic table of elements)

The mass of sulfur is

$$m(\text{S}) = N \cdot \text{MW} / N_A = 3.37 \cdot 10^{22} \cdot 32 / (6.02 \cdot 10^{23}) = 1.79 \text{ g}$$

Answer: $m(\text{S}) = 1.79 \text{ g}$