

Answer on Question #55412 – Chemistry – General chemistry

Question:

How many grams of oxygen are in 2.46×10^{23} formula units of $(\text{NH}_4)_2\text{SO}_4$?

Express your answer to three significant figures and include the appropriate units.

Solution:

$$v_{(\text{NH}_4)_2\text{SO}_4} = N_{(\text{NH}_4)_2\text{SO}_4} / N_A$$

$$v_{\text{O}} = 4 v_{(\text{NH}_4)_2\text{SO}_4}$$

$$m_{\text{O}} = v_{\text{O}} \times M_{\text{O}} = 4 M_{\text{O}} \times N_{(\text{NH}_4)_2\text{SO}_4} / N_A = 4 \times 15.999 \text{ g mol}^{-1} \times 2.46 \times 10^{23} / 6.02 \times 10^{23} \text{ mol}^{-1} = 26.2 \text{ g}$$

Answer: 26.2 g