

Scandium (Sc) is element 21 on the periodic table. A sample contains 3.29×10^{23} atoms of Sc. Calculate the amount of Sc.

Solution:

Let's find amount of moles for this number of atoms of Scandium:

$$n(\text{Sc}) = \frac{N(\text{Sc})}{N_A} = \frac{3.29 \times 10^{23}}{6.022 \times 10^{23}} = 0.5463 \text{ mol}$$

(Where N - number of atoms of Scandium, N_A - Avogadro constant)

Molar mass of Scandium is 44.956. So, we can calculate mass of this sample:

$$m(\text{Sc}) = n(\text{Sc}) \cdot M(\text{Sc}) = 0.5463 \text{ mol} \cdot 44.956 \text{ g/mol} = 24.56 \text{ g.}$$

Answer:

The amount of Scandium in sample is 0.5463 moles; this value corresponds to mass 24.56 grams.

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