

Answer on the question #63263, Chemistry / Physical Chemistry

Question:

How many formula units make up 24.6 g of magnesium chloride (MgCl₂)?

Solution:

Let's calculate the number of the moles of MgCl₂ :

$$n(\text{MgCl}_2) = \frac{m(\text{MgCl}_2)}{M(\text{MgCl}_2)} = \frac{24.6 \text{ (g)}}{95.211 \text{ (g mol}^{-1}\text{)}} = 0.258 \text{ (mol)}$$

One mole of the substance contains the number of the formulae units equal to Avogadro's number (N_A). As we calculated the number of the moles of magnesium chloride, then we can calculate the number of formulae units:

$$N(\text{MgCl}_2) = n(\text{MgCl}_2) \cdot N_A = 0.258 \text{ (mol)} \cdot 6.022 \cdot 10^{23} \text{ (mol}^{-1}\text{)} = 1.556 \cdot 10^{23}$$

Answer : 24.6g of magnesium chloride contains $1.556 \cdot 10^{23}$ formulae units.