Answer on Question #50311 - Chemistry – Other

Question

How many sodium ions are in 3.0 moles of NaCl?

Answer:

Calculate the number of NaCl molecules in 3.0 molecules of sodium chloride. The formula is:

$$N = n \cdot N_A$$

n – number of moles, n = 3.0 moles;

N_A – Avogadro constant, $N_A = 6.022 \cdot 10^{23}$ mol^{-1}.

Number of NaCl molecules in 3.0 moles is:

$$N(NaCl) = 3.0 \cdot 6.022 \cdot 10^{23} = 1.81 \cdot 10^{24}\ molecules$$

Each molecule of NaCl forms 1 sodium ion and 1 chloride ion, i.e. the number of sodium ions is equal to the number of NaCl molecules. Therefore, $N(Na^+) = N(NaCl) = 1.81 \cdot 10^{24}$.

Answer: $1.81 \cdot 10^{24}$ sodium ions are in 3.0 moles of NaCl.