

Answer on the question #62078, Chemistry / Other

Question:

A 1.000-g sample of pure organic compound was allowed to react with excess Na_2O_3 to form NaCl . The resulting sample was precipitated with excess AgNO_3 giving 1.950 AgCl . If the MW of the compound is 147, how many Chlorine atom does each molecule contain?

Solution:

First, let's calculate the number of the moles of the organic compound. It is equal to its ratio of mass and molar mass:

$$n(\text{organic}) = \frac{m}{M} = \frac{1.000\text{g}}{147\text{ g/mol}} = 6.8 \cdot 10^{-3}\text{mol}.$$

Then, we can get the number of the moles of chlorine:

$$n(\text{Cl}) = n(\text{AgCl}) = \frac{m(\text{AgCl})}{M(\text{AgCl})} = \frac{1.950\text{ g}}{143.32\text{ g/mol}} = 0.0136\text{ mol}.$$

Thus, $6.8 \cdot 10^{-3}$ mol of organic compound contains 0.0136 of chlorine. One mole of organic compound contains:

$$\frac{n(\text{Cl})}{n(\text{organic})} = \frac{0.0136}{6.8 \cdot 10^{-3}} = 2.0$$

Each molecule of organic compound contains 2 chlorine atoms.

Answer: Each molecule of organic compound contains 2 chlorine atoms.