

Task

Element analysis reveals that a 270.469g sample, which corresponds to 15.01771 moles, contains 30.2763g of H, What is the correct molecular formula?

Solution

1) Suppose the molecule formula H_nX

2) Let's find Molecular mass of H_nX

$$M(H_nX) = \frac{m(H_nX)}{n(H_nX)} = \frac{270,469}{15,01771} = 18,01 \text{ (g/mol)}$$

3) The proportion of hydrogen in the molecule is:

$$W(H_n) = \frac{m(H_n)}{m(H_nX)} = \frac{30,2763}{270,469} = 0,112$$

4) Molecular mass of H atoms in the molecule is:

$$M(H_n) = M(H_nX) * W(H_n) = 2,01 \text{ (g/mol)} - \text{it means that there are two H atoms in compound}$$

5) Molecular mass of X atoms in the molecule is:

$$M(X) = M(H_nX) - M(H_n) = 16 \text{ (g/mol)} - \text{it's an oxygen atom}$$

6) The correct molecular formula is H_2O

Answer

The correct molecular formula is H_2O

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