When 97.5 g of zinc was heated in oxygen? 121.5g of zinc oxide was formed.

Calculate the empirical formula of oxide?

Solution:

We will designate a formula that is necessary to be found: $Zn_X O_Y$

Knowing the mass of zinc oxide and zinc, which can react to find the mass of oxygen in the oxide:

$$m(O) = m(Zn_X O_Y) - m(Zn)$$

$$m(O) = 121{,}5 - 97{,}5 = 24\ g$$

Find a relationship between the number of atoms of the elements in zinc oxide, determine the indices X and Y. To do this, divide the mass of each element to its relative atomic mass:

$$n(Zn) : n(O) = \frac{m(Zn)}{A_r\,(Zn)} : \frac{m(O)}{A_r\,(O)}$$

$$n(Zn) : n(O) = \frac{97{,}5}{65{,}4} : \frac{24}{16} = 1{,}5 : 1{,}5 = 1 : 1$$

So the empirical formula of zinc oxide – ZnO.

Answer: The empirical formula of zinc oxide – ZnO.