Question # 81749

When a gas decomposes, it releases 4 parts by mass of a carbon for every one part by mass of hydrogen. What mass of hydrogen will be obtained in the decomposition of 100 g of this gas?

Answer:

The mass of hydrogen released after decomposition of 100 g of this gas is equal to 20 g.

Since the weight ratio of carbon to hydrogen is known, it is possible to calculate a mass fraction of hydrogen in this gas:

$$\omega(H_2) = \frac{m(H_2)}{m(H_2) + m(C)} = \frac{x}{x + 4 * x} = \frac{1}{5} = 0.2$$

Consequently, the mass of hydrogen released after decomposition of 100 g of this gas is equal to:

$$m(H_2) = \omega(H_2) * m(gas) = 0.2 * 100 = 20 \ g$$