Colegio de
San Francisco de Paula

Mol to mass

Sample Problem

Potassium chlorate is sometimes decomposed in the laboratory to generate oxygen. The reaction is $2KClO_3(s) \rightarrow 2KCl(s) + 3O_2(g)$. What mass of $KClO_3$ do you need to produce 0.50 mol O_2?

Solution

ANALYZE

What is given in the problem? **the amount of oxygen in moles**

What are you asked to find? **the mass of potassium chlorate**

Items	Data	
Substance	$KClO_3$	O_2
Coefficient in balanced equation	2	3
Molar mass*	122.55 g/mol	NA
Amount	? mol	0.50 mol
Mass	? g	NA

Mole to mole

So the question in words is: If 2 mol of $KClO_3$ is needed to create 3 mol of O_2, then how much is needed to create 0.50mol?

You can slve this problem in various ways but the easiest would be to use a rule of three.

3/0.5= 6 (So we have a sixth part of the balanced equation)
If we no calculate a sixth of the 2 mol of $KClO_3$ we will get the amount of mol need, so:
2/6= **0.33 mol of $KClO_3$**

Mole to mass

Now you simply need to apply the formula again to calculate the mass if you have the mol. So:
Mol x Molecular mass = mass of substance
0.33 x 122.55g/mol = **40.44 g of $KClO_3$**

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Practice

1. Phosphorus burns in air to produce a phosphorus oxide in the following reaction:

$$4P(s) + 5O_2(g) \rightarrow P_4O_{10}(s)$$

a. What mass of phosphorus will be needed to produce 3.25 mol of P_4O_{10}?

b. If 0.489 mol of phosphorus burns, what mass of oxygen is used? What mass of P_4O_{10} is produced?

2. Hydrogen peroxide breaks down, releasing oxygen, in the following reaction:

$$2H_2O_2(aq) \rightarrow 2H_2O(l) + O_2(g)$$

a. What mass of oxygen is produced when 1.840 mol of H_2O_2 decomposes?

b. What mass of water is produced when 5.0 mol O_2 is produced by this reaction?

UPLOAD YOUR ANSWERS FOR PEER ASSESSMENT. DISCUSS THE PROBLEMS IN THE FORUM