



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 $2\text{KClO}_3(\text{s}) \rightarrow 2\text{KCl}(\text{s}) + 3\text{O}_2(\text{g})$. 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 solve 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 now calculate a sixth of the 2 mol of KClO_3 we will get the amount of mol need, so:

$2/6 = 0.33 \text{ mol of KClO}_3$

Mole to mass

Now you simply need to apply the formula again to calculate the mass if you have the mol. So:

$\text{Mol} \times \text{Molecular mass} = \text{mass of substance}$

$0.33 \times 122.55 \text{g/mol} = 40.44 \text{ g of KClO}_3$

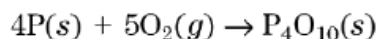


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Practice

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



- 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:



- 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