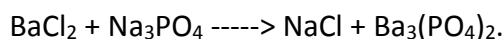


Answer to the Question #47430 - Chemistry – Inorganic Chemistry

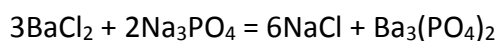
Question



If 0.5 moles of BaCl_2 is mixed with 0.2 moles of Na_3PO_4 , the maximum number of moles of $\text{Ba}_3(\text{PO}_4)_2$ that can be formed is?

Answer:

Balanced reaction equation is:



Make a proportion:

3 moles of BaCl_2 react with 2 moles of Na_3PO_4

0.5 moles of BaCl_2 – x moles of Na_3PO_4

$$x = \frac{0.5 \cdot 2}{3} = 0.33 \text{ moles of } \text{Na}_3\text{PO}_4 \text{ should react with 0.5 moles of } \text{BaCl}_2$$

We have only 0.2 moles of Na_3PO_4 , therefore it is the limiting reactant.

We need to make another proportion to calculate the maximum number of moles of $\text{Ba}_3(\text{PO}_4)_2$ that can be formed by mixing 0.5 moles of BaCl_2 with 0.2 moles of Na_3PO_4 :

2 moles of Na_3PO_4 produce 1 mole of $\text{Ba}_3(\text{PO}_4)_2$

0.2 moles of Na_3PO_4 – x moles of $\text{Ba}_3(\text{PO}_4)_2$

$$x = \frac{0.2 \cdot 1}{2} = 0.1 \text{ moles of } \text{Ba}_3(\text{PO}_4)_2 \text{ could be produced}$$

Answer: 0.1 moles of $\text{Ba}_3(\text{PO}_4)_2$