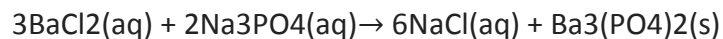


Answer on Question #51826, Chemistry, Inorganic Chemistry

Question: A mixture, weighing 6.000 grams, contains 41.50 % Na₃PO₄ and 58.50 % BaCl₂ of the mixture, by weight. When dissolved in water, a precipitate forms via the double displacement reaction:



If the reaction is quantitative, the yield of the solid barium phosphate should be

Answer:

The mass of Na₃PO₄ in the mixture: $6.000 \times 0.4150 = 2.49\text{g}$

The number of moles of Na₃PO₄: $2.49/164 = 0.0152\text{moles}$.

The mass of BaCl₂: $6 - 2.49 = 3.51\text{g}$.

The number of moles of BaCl₂: $3.51/208 = 0.0169$

From the equation and our previous calculation it can be determined that Na₃PO₄ is a limiting reactant. The number of moles of Ba₃(PO₄)₂ is 2 times smaller than the number of moles of Na₃PO₄, so the number of moles of Ba₃(PO₄)₂ will be: $0.0152/2 = 0.0076\text{moles}$.

Yield of Ba₃(PO₄)₂ is $0.0076 \times 601 = 4.568\text{g}$.

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