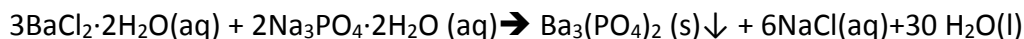


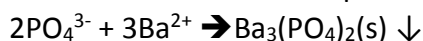
Answer on Question #70863 - Chemistry - General Chemistry

Question : What is the minimum number of moles of $\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$ that would be required to react with 0.694 mol of $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$? Do not include units with your answer.?

Solution:



The two reactant salts and sodium chloride are soluble in water but barium phosphate is insoluble. The net ionic equation for the observed reaction is



Net ionic equation is an equation that includes only those ions that participate in the observed chemical reaction. From the balanced net ionic equation, 2 moles of phosphate ion (from the 2 mol of $\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$, molar mass = 380.12 g/mol, or 760.24 g) react with 3 moles of barium ion (from 3 mol of $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$, molar mass = 244.27 g/mol, or 732.81 g), if the reaction proceeds to completion. The equation also predicts the formation of 1 mole of $\text{Ba}_3(\text{PO}_4)_2$ (molar mass = 601.93 g/mol), or 601.93 g. So, solving simple proportion:

2 mol of $\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$ corresponds 3 mol of $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$

X mol of $\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$ corresponds 0.694 mol of $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$

$$X = (0.694 \cdot 2) / 3 = 0.463 \text{ mol}$$

So 0.463 mol is the minimum number of moles of $\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$ that would be required to react with 0.694 mol of $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$

Answer: 0,463

Answer provided by <https://www.AssignmentExpert.com>