

Answer on Question #43040 - Chemistry - Other

Question:

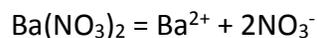
10 mole of $\text{Ba}(\text{NO}_3)_2$ dissolves in water to give how many NO_3^- ions?

- 1 - 6.02×10 to the 23
- 2 - 6.02×10 to the minus 23
- 3 - 6.02×10 to the 24
- 4 - 1.204×10 to the 23
- 5 - 1.204×10 to the 25

What I want to know is how do I work out the question.

Answer:

Dissolution equation for $\text{Ba}(\text{NO}_3)_2$:



We see that each molecule of barium nitrate dissociates producing 2 NO_3^- ions. So, one mole of $\text{Ba}(\text{NO}_3)_2$ produces 2 moles of NO_3^- ions, and 10 mol of $\text{Ba}(\text{NO}_3)_2$ produce 20 mol of NO_3^- ions.

One mole of any substance has 6.02×10^{23} particles (atoms, molecules or ions; Avogadro constant). So, we make a proportion:

$$\begin{aligned} &1 \text{ mol has } 6.02 \times 10^{23} \text{ particles} \\ &20 \text{ mol of } \text{NO}_3^- \text{ ions} - x \text{ NO}_3^- \text{ ions} \\ &x = \frac{20 \cdot 6.02 \cdot 10^{23}}{1} = 1.204 \cdot 10^{25} \end{aligned}$$

So, 10 mole of $\text{Ba}(\text{NO}_3)_2$ dissolves in water giving $1.204 \cdot 10^{25}$ NO_3^- ions.

Answer: 5 - 1.204×10 to the 25.