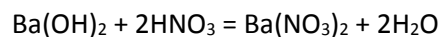


#68538 Chemistry, Other

What is the final solution pH after 60 mL 0.05 M Ba(OH)₂ is mixed with 25 mL 0.20 M HNO₃?

Answer:



Ba(OH)₂ is a strong alkali. HNO₃ is a strong acid.

In order to determine pH, we have to determine limiting reagent.

According to equation, $n(\text{Ba(OH)}_2) = 2 \cdot n(\text{HNO}_3)$

$$C_M = n/V \qquad n = C_M \cdot V$$

$$n(\text{Ba(OH)}_2) = 0.05 \cdot 60 = 3 \text{ mmol}$$

$$n(\text{HNO}_3) = 0.2 \cdot 25 = 5 \text{ mmol}$$

$$\text{But it must be: } 2 \cdot n(\text{Ba(OH)}_2) = 3 \cdot 2 = 6 \text{ mmol}$$

Therefore, HNO₃ is the limiting reagent. There will be an excess of Ba(OH)₂ of $(3 - 5/2 = 0.5 \text{ mmol})$ with an anticipated basic pH.

$$\text{pOH} = -\lg[0.0005] = 3.3$$

$$\text{pH} + \text{pOH} = 14$$

$$\text{pH} = 14 - 3.3 = 10.7$$