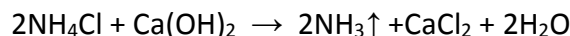


What volume of ammonia is evolved when ammonium chloride is passed through 1.48 grams of calcium hydroxide?

Solution: The equation of chemical reaction between ammonium chloride and calcium hydroxide is:



We will assume that the quantity of ammonium chloride is in excess to the substance amount of calcium hydroxide, and all calcium hydroxide fully reacts with ammonium chloride.

As you see, 1 mol of calcium hydroxide produces 2 moles of gaseous ammonia. According to the Avogadro's law, at the STP 1 mole of gas has a volume of 22.4 liters.

We will calculate the amount of substance of obtained ammonia:

$$n(\text{NH}_3) = 2n(\text{Ca}(\text{OH})_2) = 2 \frac{m(\text{Ca}(\text{OH})_2)}{M(\text{Ca}(\text{OH})_2)}, \text{ where } n, m, M \text{ are the amount of substance, mol, mass, g,}$$

molar mass, g/mol, respectively. $M(\text{Ca}(\text{OH})_2) = 40 + 2 \cdot 17 = 74 \text{ g/mol}$;

$$n(\text{NH}_3) = 2 \cdot \frac{1.48}{74} = 0.04 \text{ mol};$$

Then, volume of obtained ammonia at the STP is $V(\text{NH}_3) = n(\text{NH}_3) \cdot V_m = 0.04 \cdot 22.4 = 0.9 \text{ liters}$.

Answer: 0.9 liters.