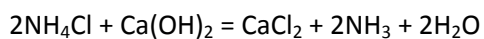


Task:

What volume of Ammonia is evolved when Ammonium chloride is passed through 1.48 grams of CalciumHydroxide

Solution:

The chemical equation of the reaction is



The number of moles of $\text{Ca}(\text{OH})_2$ is

$$n(\text{mol}) = m(\text{g}) / \text{MW}(\text{g/mol})$$

$$\text{MW}(\text{Ca}(\text{OH})_2) = \text{AW}(\text{Ca}) + 2 \cdot \text{AW}(\text{O}) + 2 \cdot \text{AW}(\text{H}) = 40 + 2 \cdot 16 + 2 \cdot 1 = 74 \text{ g/mol}$$

$$n(\text{Ca}(\text{OH})_2) = 1.48 / 74 = 0.02 \text{ mol}$$

According to the chemical equation the number of moles of NH_3 is

$$n(\text{NH}_3) = 2 \cdot n(\text{Ca}(\text{OH})_2) = 2 \cdot 0.02 = 0.04 \text{ mol}$$

The volume of NH_3 at STP is

$$V(\text{L}) = n(\text{mol}) \cdot V_0(\text{L})$$

$$V_0(\text{L}) = 22.4\text{L} - \text{the volume of 1 mol of gas at STP (p= 1atm, T= 273K)}$$

$$V(\text{L}) = 0.04 \cdot 22.4 = 0.896 \text{ L}$$

Answer: $V(\text{L}) = 0.896 \text{ L}$