

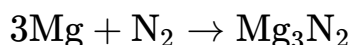
Magnesium Reaction To Ammonia Calculation

<https://gemini.google.com/app/51ebcf53de5a36c9>

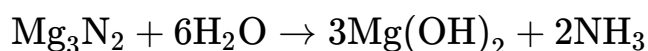
Response: Here is the step-by-step solution to solve the problem:

1. Identify the Chemical Reactions

- **Reaction 1:** Magnesium reacts with excess nitrogen to form magnesium nitride (Mg_3N_2):



- **Reaction 2:** Magnesium nitride reacts with water to yield magnesium hydroxide and ammonia gas (NH_3):

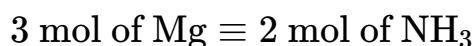


2. Determine Stoichiometric Relations

From the balanced equations:

- 3 mol of Mg $\rightarrow$ 1 mol of Mg_3N_2
- 1 mol of $\text{Mg}_3\text{N}_2 \rightarrow$ 2 mol of NH_3

Therefore, the relationship between Mg and the evolved gas NH_3 is:



3. Calculate the Moles of Evolved Gas (NH_3)

Given:

- Volume of $\text{NH}_3 = 672 \text{ cm}^3 = 0.672 \text{ dm}^3$
- Molar volume at STP = $22.4 \text{ dm}^3/\text{mol}$

$$\text{Moles of NH}_3 = \frac{0.672 \text{ dm}^3}{22.4 \text{ dm}^3/\text{mol}} = 0.03 \text{ mol}$$

4. Calculate the Mass of Mg

Using the mole ratio:

$$\text{Moles of Mg} = \text{Moles of NH}_3 \times \frac{3}{2} = 0.03 \text{ mol} \times 1.5 = 0.045 \text{ mol}$$

Now, convert moles of Mg to mass using its relative atomic mass (24 g/mol):

$$\text{Mass of Mg} = 0.045 \text{ mol} \times 24 \text{ g/mol} = \mathbf{1.08 \text{ g}}$$

Conclusion

- The correct option is **(4) 1.08 g**.
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