

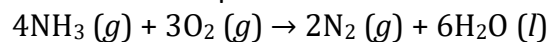
Answer on Question #85474 - Chemistry - General Chemistry

Task:

How many grams of O_2 are needed to react with 57.3 g of NH_3 ?

Solution:

The balanced equation for reaction when ammonia burns in oxygen can be written as follows



$$\frac{m(NH_3)}{M(4NH_3)} = \frac{m(O_2)}{M(3O_2)}$$

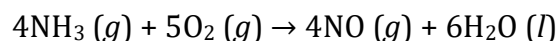
$$m(O_2) = \frac{m(NH_3) \cdot M(3O_2)}{M(4NH_3)}$$

$$M(4NH_3) = 4 \cdot (14 + 3 \cdot 1) = 68 \text{ amu}$$

$$M(3O_2) = 3 \cdot (2 \cdot 16) = 96 \text{ amu}$$

$$m(O_2) = \frac{57.3 \cdot 96}{68} \approx 80.9 \text{ g}$$

From the other hand, the balanced equation for reaction when ammonia burns in air can be written as follows



$$\frac{m(NH_3)}{M(4NH_3)} = \frac{m(O_2)}{M(5O_2)}$$

$$m(O_2) = \frac{m(NH_3) \cdot M(5O_2)}{M(4NH_3)}$$

$$M(4NH_3) = 4 \cdot (14 + 3 \cdot 1) = 68 \text{ amu}$$

$$M(5O_2) = 5 \cdot (2 \cdot 16) = 160 \text{ amu}$$

$$m(O_2) = \frac{57.3 \cdot 160}{68} \approx 134.8 \text{ g}$$

Answer:

80.9 g (for ammonia burning in oxygen) or 134.8 g (for ammonia burning in air)