Answer on Question #84287 – Chemistry – General Chemistry

Task:

How many liters of NH_3 are needed to react completely with 16.0 L of NO (at STP)?

Solution:

The balance chemical equation is as follow,

$$4NH_3 + 6NO = 5N_2 + 6H_2O$$

One mole of an **ideal gas at STP** occupies 22.4 liters. (V_m = 22.4 L/mol).

According to equation,

$$\frac{n(NH_3)}{4} = \frac{n(NO)}{6};$$

$$n = \frac{V}{V_m};$$

$$\frac{V(NH_3)}{4*V_m} = \frac{V(NO)}{6*V_m};$$

$$\frac{V(NH_3)}{2} = \frac{V(NO)}{3};$$

$$V(NH_3) = \frac{2*V(NO)}{3} = \frac{2*16.0L}{3} = 10.67L$$

$$V(NH_3) = 10.67L$$

Answer: 10.67 liters of NH_3.