Answer on Question #68506 - Chemistry – Other

Task:

How many liters of NH_3 gas could be prepared by reacting 750L of nitrogen gas with an excess of hydrogen gas in the following reaction? $N_2(g)+ 3H_2(g)$ -----> $2NH_3(g)$.

Solution:

Let us find the amount of nitrogen (N_2):

$$n(N_2) = \frac{V(N_2)}{Vm} = \frac{750L}{22.4\,L/mol} = 33.482\,moles\ of\ N_2.$$

The reaction equation:

$$N_2(g) + 3H_2(g) = 2NH_3(g)$$

By the reaction equation: $n(N_2) = \frac{n(NH_3)}{2}$

Then,

$$n(NH_3) = 2 * n(N_2) = 2 * 33.482 = 66.964\,moles\ of\ NH_3.$$
$$V(NH_3) = n(NH_3) * Vm = 66.964\,mol * 22.4\,L/mol = 1500\,L.$$

Answer: 1500 liters of NH_3.