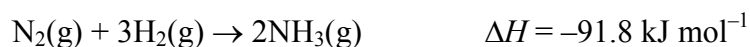


- How much heat is evolved when 907 g of ammonia is produced according to the following equation? (Assume the reaction occurs at constant pressure.)



The molar mass of ammonia, NH_3 , is $14.01 \text{ (N)} + 3 \times 1.008 \text{ (H)} = 17.034 \text{ g mol}^{-1}$.

Thus, the number of moles of ammonia is:

$$\text{number of moles} = \frac{\text{mass (in g)}}{\text{molar mass (in g mol}^{-1}\text{)}} = \frac{907 \text{ g}}{17.034 \text{ g mol}^{-1}} = 53.2 \text{ mol}$$

The chemical equation shows that when *two* moles are produced, $\Delta H = -91.8 \text{ kJ mol}^{-1}$ and so half this value is evolved when *one* mole is produced.

Hence, 53.2 mol will produce:

$$\text{heat produced} = 91.8 \text{ kJ mol}^{-1} \times 0.5 \times 53.2 \text{ mol} = 2440 \text{ kJ} = 2.44 \text{ MJ}$$

Answer: 2440 kJ or 2.44 MJ