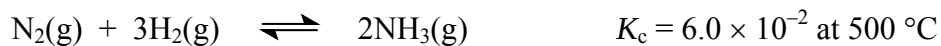


Marks
2

- Consider the ammonia synthesis reaction shown below.



ΔH° for this reaction is -92 kJ mol^{-1} . Calculate the value of K_c at 200°C .

Using the Van't Hoff equation,

$$\ln\left(\frac{K_2}{K_1}\right) = \frac{-\Delta H^\circ}{R} \left(\frac{1}{T_2} - \frac{1}{T_1}\right)$$

with $K_1 = 6.0 \times 10^{-2}$ at $T_1 = (500 + 273) \text{ K} = 773 \text{ K}$, the value of K_2 at $T_2 = (200 + 273) \text{ K} = 473 \text{ K}$ can be calculated:

$$\ln\left(\frac{K_2}{6.0 \times 10^{-2}}\right) = \frac{(-92 \times 10^3 \text{ J mol}^{-1})}{(8.314 \text{ J K}^{-1} \text{ mol}^{-1})} \left(\frac{1}{(473 \text{ K})} - \frac{1}{(773 \text{ K})}\right)$$

$$K_2 = 530$$

Answer: **530**