

Quiz (Equilibrium Constant)

Consider the following reaction:



- (a) Write the expression of equilibrium constant (K_c) of the reaction.
- (b) What is the unit of K_c for the equilibrium system?
- (c) At 298 K, 1 atm, an equilibrium mixture was found to have the following composition:

$$[\text{NH}_3(\text{g})] = 0.50 \text{ mol dm}^{-3}$$

$$[\text{O}_2(\text{g})] = 0.60 \text{ mol dm}^{-3}$$

$$[\text{NO}(\text{g})] = 1.20 \text{ mol dm}^{-3}$$

$$[\text{H}_2\text{O}(\text{g})] = 0.30 \text{ mol dm}^{-3}$$

Calculate the equilibrium constant, K_c , for the reaction.

- (d) What is the K_c at 298 K, 2 atm?

Suggested Answer

(a) $K_c = [\text{NO}(\text{g})]^4 [\text{H}_2\text{O}(\text{g})]^6 / [\text{NH}_3(\text{g})]^4 [\text{O}_2(\text{g})]^5$

(b) The unit of $K_c = (\text{mol dm}^{-3})^4 (\text{mol dm}^{-3})^6 / (\text{mol dm}^{-3})^4 (\text{mol dm}^{-3})^5$
 $= \text{mol dm}^{-3}$

(c) $K_c = (1.20)^4 (0.30)^6 / (0.50)^4 (0.60)^5$
 $= 0.3110 \text{ mol dm}^{-3}$

(d) No change in K_c .