

Equilibrium worksheet 2

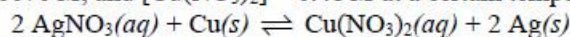
Equilibrium

7.4 Calculating the Equilibrium Constant

7.5 Magnitude of the Equilibrium Constant

7.6 Properties of the Equilibrium Constant

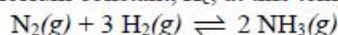
- 1) The equilibrium concentrations for the reaction below were found to be $[\text{AgNO}_3] = 0.0070 \text{ M}$, and $[\text{Cu}(\text{NO}_3)_2] = 0.48 \text{ M}$ at a certain temperature.



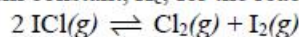
Find the equilibrium constant, K_c , for the reaction.

- 2) The equilibrium concentrations for the reaction below were found to be $[\text{N}_2] = 0.13 \text{ M}$, $[\text{H}_2] = 7.9 \times 10^{-2} \text{ M}$, and $[\text{NH}_3] = 1.6 \text{ M}$ at a certain temperature.

Find the equilibrium constant, K_c , at this temperature.

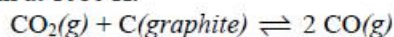


- 3) The equilibrium constant, K_c , for the reaction below is 0.10 at 25°C .



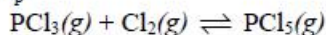
Find the equilibrium concentration of chlorine gas, $\text{Cl}_2(g)$, if the equilibrium concentrations of $\text{ICl}(g)$ and $\text{I}_2(g)$ are known to be 0.50 M and 0.40 M respectively.

- 4) The equilibrium partial pressures for the reaction below are $P(\text{CO}) = 0.598 \text{ atm}$ and $P(\text{CO}_2) = 0.159 \text{ atm}$ at 1080 K .

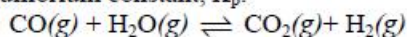


Find the value of the equilibrium constant, K_p .

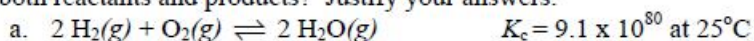
- 5) The equilibrium partial pressures for the reaction below are $P(\text{PCl}_3) = 0.12 \text{ atm}$, $P(\text{Cl}_2) = 0.16 \text{ atm}$ and $P(\text{PCl}_5) = 1.30 \text{ atm}$ at 455 K . Find the value of the equilibrium constant, K_p .



- 6) The equilibrium partial pressures for the reaction below are $P(\text{CO}) = 1.31 \text{ atm}$, $P(\text{H}_2\text{O}) = 10.00 \text{ atm}$, $P(\text{CO}_2) = 6.10 \text{ atm}$, and $P(\text{H}_2) = 20.5 \text{ atm}$ at 700 K . Find the value of the equilibrium constant, K_p .



- 7) When each of the following processes reach equilibrium, does the system in question contain mostly reactants, mostly products, or fairly equal concentrations of both reactants and products? Justify your answers.



- 8) The equilibrium constant, K_c , for the following reaction is 6.44×10^5 at 230°C .
$$2 \text{NO}(g) + \text{O}_2(g) \rightleftharpoons 2 \text{NO}_2(g)$$

- Calculate the equilibrium constant, K_c , for the reaction below at 230°C .
$$\text{NO}(g) + \frac{1}{2} \text{O}_2(g) \rightleftharpoons \text{NO}_2(g)$$
- Calculate the equilibrium constant, K_c , for the reaction below at 230°C .
$$2 \text{NO}_2(g) \rightleftharpoons 2 \text{NO}(g) + \text{O}_2(g)$$
- Calculate the equilibrium constant, K_c , for the reaction below at 230°C .
$$\text{NO}_2(g) \rightleftharpoons \text{NO}(g) + \frac{1}{2} \text{O}_2(g)$$

- 9) The equilibrium constant, K_p , for the following reaction is 1.3×10^{14} at 850°C .
$$\text{C}(s) + \text{CO}_2(g) \rightleftharpoons 2 \text{CO}(g)$$

- Calculate the equilibrium constant, K_p , for the reaction below at 850°C .
$$2 \text{C}(s) + 2 \text{CO}_2(g) \rightleftharpoons 4 \text{CO}(g)$$
- Calculate the equilibrium constant, K_p , for the reaction below at 850°C .
$$2 \text{CO}(g) \rightleftharpoons \text{C}(s) + \text{CO}_2(g)$$
- If the equilibrium constant, K_p , is 167 for $\text{COCl}_2(g) \rightleftharpoons \text{CO}(g) + \text{Cl}_2(g)$ at 850°C , find K_p for $\text{COCl}_2(g) \rightleftharpoons \text{Cl}_2(g) + \frac{1}{2} \text{CO}_2(g) + \frac{1}{2} \text{C}(s)$ at 850°C .

- 10) The equilibrium constant, K_c^{i} , is 3.2×10^{-34} for $2\text{HCl}(g) \rightleftharpoons \text{H}_2(g) + \text{Cl}_2(g)$ at 25°C . The equilibrium constant, K_c^{ii} , is 0.10 for $2 \text{ICl}(g) \rightleftharpoons \text{Cl}_2(g) + \text{I}_2(g)$ at 25°C .

- Calculate the equilibrium constant, K_c , for the reaction below at 25°C .
$$\text{Cl}_2(g) + \text{I}_2(g) \rightleftharpoons 2 \text{ICl}(g)$$
- Calculate the equilibrium constant, K_c , for the reaction below at 25°C .
$$2 \text{HCl}(g) + \text{I}_2(g) \rightleftharpoons 2 \text{ICl}(g) + \text{H}_2(g)$$
- Calculate the equilibrium constant, K_c , for the reaction below at 25°C .
$$\text{HCl}(g) + \frac{1}{2} \text{I}_2(g) \rightleftharpoons \text{ICl}(g) + \frac{1}{2} \text{H}_2(g)$$
- Calculate the equilibrium constant, K_c , for the reaction below at 25°C .
$$6 \text{HCl}(g) + 3 \text{I}_2(g) \rightleftharpoons 6 \text{ICl}(g) + 3 \text{H}_2(g)$$