Equilibrium #4

Key.

Write the equilibrium constant expression for each equilibrium.

1. $2ICl_{(g)} \longleftrightarrow I_{2(g)} + Cl_{2(g)}$

$$K_{eq} = \frac{[I_2][Cl_2]}{[ICl]^2}$$

2. $N_{2(g)} + O_{2(g)} \longleftrightarrow 2NO_{(g)}$

$$K_{eq} = \frac{[NO]^2}{[N_2][O_2]}$$

3. $3O_{2(g)} \longleftrightarrow 2O_{3(g)}$

$$K_{eq} = \frac{[O_3]^2}{[O_2]^3}$$

4. $N_2O_{3(g)} \longleftrightarrow NO_{(g)} + NO_{2(g)}$

$$K_{eq} = \frac{[NO][NO_2]}{[N_2O_3]}$$

5. $2H_{2(g)} + 2NO_{(g)} \longleftrightarrow N_{2(g)} + 2H_2O_{(g)}$

$$K_{eq} = \frac{[N_2][H_2O]^2}{[H_2]^2[NO]^2}$$

6. $2Bi^{3+}_{(aq)} + 3H_2S_{(g)} \longleftrightarrow Bi_2S_{3(s)} + 6H^+_{(aq)}$

$$K_{eq} = \frac{[H^+]^6}{[Bi^{3+}]^2[H_2S]^3}$$

7. $CaCO_{3(s)} \longleftrightarrow CaO_{(s)} + CO_{2(g)}$

$$K_{eq} = [CO_2]$$

8. $CaC_{2(s)} + 2H_2O_{(l)} \longleftrightarrow C_2H_{2(g)} + Ca(OH)_{2(s)}$

$$K_{eq} = [C_2H_2]$$

9. $C_6H_{6(l)} + Br_{2(l)} \longleftrightarrow C_6H_5Br_{(l)} + HBr_{(g)}$

$$K_{eq} = \frac{[C_6H_5Br][HBr]}{[C_6H_6][Br_2]}$$

10. $Cu_{(s)} + 2Ag^+_{(aq)} \longleftrightarrow Cu^{2+}_{(aq)} + 2Ag_{(s)}$

$$K_{eq} = \frac{[Cu^{2+}]}{[Ag^+]^2}$$

Key.

11. $4NH_{3(g)} + 5O_{2(g)} \longleftrightarrow 6H_2O_{(g)} + 4NO_{(g)}$

$$K_{eq} = \frac{[H_2O]^6[NO]^4}{[NH_3]^4[O_2]^5}$$

12. $H_{2(g)} + \frac{1}{2}O_{2(g)} \longleftrightarrow H_2O_{(l)}$

$$K_{eq} = \frac{1}{[H_2][O_2]^{1/2}}$$

13. $CO_{(g)} + \frac{1}{2}O_{2(g)} \longleftrightarrow CO_{2(g)}$

$$K_{eq} = \frac{[CO_2]}{[CO][O_2]^{1/2}}$$

14. $I_{2(s)} + Cl_{2(g)} \longleftrightarrow 2ICl_{(g)}$

$$K_{eq} = \frac{[ICl]^2}{[Cl_2]}$$

15. $SnO_{2(s)} + 2CO_{(g)} \longleftrightarrow Sn_{(s)} + 2CO_{2(g)}$

$$K_{eq} = \frac{[CO_2]^2}{[CO]^2}$$

16. $Fe^{3+}_{(aq)} + SCN^-_{(aq)} \longleftrightarrow FeSCN^{2+}_{(aq)}$

$$K_{eq} = \frac{[FeSCN^{2+}]}{[Fe^{3+}][SCN^-]}$$

17. $2CrO_4^{2-}{}_{(aq)} + 2H^+_{(aq)} \longleftrightarrow Cr_2O_7^{2-}{}_{(aq)} + H_2O_{(l)}$

$$K_{eq} = \frac{[Cr_2O_7^{2-}]}{[CrO_4^{2-}]^2[H^+]^2}$$

18. $Fe^{3+}_{(aq)} + 4Cl^-_{(aq)} \longleftrightarrow FeCl_4^-{}_{(aq)}$

$$K_{eq} = \frac{[FeCl_4^-]}{[Fe^{3+}][Cl^-]^4}$$

19. $H_2O_{(l)} \longleftrightarrow H^+_{(aq)} + OH^-_{(aq)}$

$$K_{eq} = [H^+][OH^-]$$

20. $BaSO_{4(s)} \longleftrightarrow Ba^{2+}_{(aq)} + SO_4^{2-}{}_{(aq)}$

$$K_{eq} = [Ba^{2+}][SO_4^{2-}]$$