TRANSITION METALS (G)

Write a balanced equation for each of the following ligand substitution reactions.

1 Addition of ammonia (aq) to a solution containing $[Co(H_2O)_6]^{2+}$

$$[Co(H_2O)_6]^{2+} + 6NH_3 \rightarrow [Co(NH_3)_6]^{2+} + 6H_2O$$

2 Addition of concentrated hydrochloric acid to a solution containing $[Fe(H_2O)_6]^{3+}$

$$[Fe(H_2O)_6]^{3+} + 4Cl^- \rightarrow [FeCl_4]^- + 6H_2O$$

3 Addition of 1,2-aminoethane to a solution containing [Co(NH₃)₆]²⁺

$$[Co(NH_3)_6]^{2+} + 3NH_2CH_2CH_2NH_2 \rightarrow [Co(NH_2CH_2CH_2NH_2)_3]^{2+} + 6NH_3$$

4 Addition of sodium ethanedioate (aq) to a solution containing [Cr(H₂O)₆]³⁺

$$[Cr(H_2O)_6]^{3+} + 3C_2O_4^{2-} \rightarrow [Co(C_2O_4)_3]^{3-} + 6H_2O_4^{2-}$$

5 Addition of sodium EDTA (aq) to a solution containing $[Fe(H_2O)_6]^{2+}$

$$[Fe(H_2O)_6]^{2+} + EDTA^{4-} \rightarrow [Fe(EDTA)]^{2-} + 6H_2O$$

6 Addition of ammonia (aq) to a solution containing $[Cu(H_2O)_6]^{2+}$

$$[Cu(H_2O)_6]^{2+} + 4NH_3 \rightarrow [Cu(H_2O)_2(NH_3)_4]^{2+} + 4H_2O$$

7 Addition of sodium EDTA (aq) to a solution containing [Cr(NH₂CH₂CH₂NH₂)₃|³⁺

$$[Cr(NH2CH2CH2NH2)3]3+ + EDTA4- \rightarrow [Cr(EDTA)]- + 3NH2CH2CH2NH2$$

8 Addition of concentrated hydrofluoric acid to a solution containing [Cu(H₂O)₆]²⁺

$$[Cu(H_2O)_6]^{2+} + 6F^- \rightarrow [CuF_6]^{4-} + 6H_2O$$

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