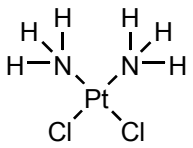
AP Chemistry Chapter 3 Answers - Kotz

3.3 The molecular formula of cisplatin is $Pt(NH_3)_2Cl_2$. The structural formula is.



3.8
(a) MnO_4^-
(b) NO_2^-
(c) $H_2PO_4^-$
(d) NH_4^+
(e) PO_4^{3-}
(f) SO_3^{2-}

3.17
(a) incorrect, $AlCl_3$
(b) incorrect, KF
(c) correct
(d) correct

3.20
(a) calcium acetate
(b) nickel(II) phosphate
(c) aluminum hydroxide
(d) potassium dihydrogen phosphate

3.21
(a) $(NH_4)_2CO_3$
(b) CaI_2
(c) $CuBr_2$
(d) $AlPO_4$
(e) $AgCH_3CO_2$

3.25 The force of attraction is stronger in NaF than in NaI because the distance between ion centers is smaller in NaF (235 pm) than in NaI (322 pm).

3.30
(a) BrF_3
(b) XeF_2
(c) N_2H_4
(d) P_2F_4
(e) C_4H_{10}

3.31
(a) Fe_2O_3 159.69 g/mol
(b) BCl_3 117.17 g/mol
(c) $C_6H_8O_6$ 176.13 g/mol

3.33
(a) $Ni(NO_3)_2 \cdot 6\ H_2O$ 290.79 g/mol
(b) $CuSO_4 \cdot 5\ H_2O$ 249.69 g/mol

3.37 $$2.50 \text{ kg } CH_3CN \cdot \frac{10^3 \text{ g}}{1 \text{ kg}} \cdot \frac{1 \text{ mol } CH_3CN}{41.05 \text{ g } CH_3CN} = 60.9 \text{ mol } CH_3CN$$

3.44 $$\frac{(2)(55.85) \text{ g Fe}}{159.70 \text{ g } Fe_2O_3} \cdot 100\% = 69.94\% \text{ Fe}$$

$$25.0 \text{ g } Fe_2O_3 \cdot \frac{69.94 \text{ g Fe}}{100.00 \text{ g } Fe_2O_3} = 17.5 \text{ g Fe}$$

3.54 The compound is 36.84% N and 63.16% O. Assume 100.00 g of compound.

$$36.84 \text{ g N} \cdot \frac{1 \text{ mol N}}{14.007 \text{ g N}} = 2.630 \text{ mol N} \qquad 63.16 \text{ g O} \cdot \frac{1 \text{ mol O}}{15.999 \text{ g O}} = 3.948 \text{ mol O}$$

$$\frac{3.948 \text{ mol O}}{2.630 \text{ mol N}} = \frac{1.5 \text{ mol O}}{1 \text{ mol N}} = \frac{3 \text{ mol O}}{2 \text{ mol N}}$$

The empirical formula is N_2O_3

3.57 1.687 g hydrated compound – 0.824 g $MgSO_4$ = 0.863 g H_2O

$$0.863 \text{ g } H_2O \cdot \frac{1 \text{ mol } H_2O}{18.02 \text{ g } H_2O} = 0.0479 \text{ mol } H_2O$$

$$0.824 \text{ g } MgSO_4 \cdot \frac{1 \text{ mol } MgSO_4}{120.4 \text{ g } MgSO_4} = 0.00684 \text{ mol } MgSO_4$$

$$\frac{0.0479 \text{ mol } H_2O}{0.00684 \text{ mol } MgSO_4} = \frac{7.00 \text{ mol } H_2O}{1 \text{ mol } MgSO_4}$$

There are 7 water molecules per formula unit of $MgSO_4$

3.59 0.678 g compound – 0.526 g Xe = 0.152 g F

$$0.526 \text{ g Xe} \cdot \frac{1 \text{ mol Xe}}{131.3 \text{ g Xe}} = 0.00401 \text{ mol Xe} \qquad 0.152 \text{ g F} \cdot \frac{1 \text{ mol F}}{19.00 \text{ g F}} = 0.00800 \text{ mol F}$$

$$\frac{0.00800 \text{ mol F}}{0.00401 \text{ mol Xe}} = \frac{2 \text{ mol F}}{1 \text{ mol Xe}}$$

The empirical formula is XeF_2

3.60 5.722 g compound – 1.256 g S = 4.466 g F

$$1.256 \text{ g S} \cdot \frac{1 \text{ mol S}}{32.066 \text{ g S}} = 0.03917 \text{ mol S} \qquad 4.466 \text{ g F} \cdot \frac{1 \text{ mol F}}{18.998 \text{ g F}} = 0.2351 \text{ mol F}$$

$$\frac{0.2351 \text{ mol F}}{0.03917 \text{ mol S}} = \frac{6 \text{ mol F}}{1 \text{ mol S}}$$

The empirical formula is SF_6; $x = 6$