

Chapter 27 Answers

$$9] 0.2146 \text{ g AgBr} * (\text{mol AgBr}/187.772 \text{ g}) * (\text{mol Br}^-/\text{mol AgBr}) * (1/0.05000 \text{ L}) = 2.286\text{e-}2 \text{ M}$$

$$10] 0.104 \text{ g CeO}_2 * (\text{mol CeO}_2/172.114 \text{ g}) * (\text{mol Ce}/\text{mol CeO}_2) \\ * (140.1 \text{ g Ce}/\text{mol}) * (100/4.37 \text{ g}) = 1.94\%$$

$$11] 0.7129 * 0.05002 \text{ g piperazine} * (\text{mol piperazine}/86.136 \text{ g}) \\ * (1 \text{ mol pip-diacetate}/\text{mol piperazine}) * (206.240 \text{ g}/\text{mol pip-diacetate}) = 0.08538 \text{ g}$$

$$12] 2.500 \text{ g Ni-bdg} * (\text{mol Ni-bdg}/288.91 \text{ g}) * (\text{mol Ni}/\text{mol Ni-bdg}) \\ * (58.69 \text{ g Ni}/\text{mol}) * (100/1.000 \text{ g}) = 50.79\%$$

$$14] 2.378\text{e-}3 \text{ g CO}_2 * (\text{mol CO}_2/44.01 \text{ g}) * (12.01 \text{ g C}/\text{mol CO}_2) * (1\text{e}6/6.234 \text{ g}) = 104.1 \text{ ppm}$$

$$17] \text{ let } x = \text{mass NH}_4\text{Cl} \quad \text{let } y = \text{mass K}_2\text{CO}_3$$

$$\text{Sample mass} = 0.25 * 1.475 = 0.3688 \text{ g}$$

$$x * (\text{mol NH}_4\text{Cl}/53.492 \text{ g}) * (\text{mol NH}_4\text{TPB}/\text{mol NH}_4\text{Cl}) * (337.27 \text{ g NH}_4\text{TPB}/\text{mol}) = 6.305 x$$

$$y * (\text{mol K}_2\text{CO}_3/138.21 \text{ g}) * (2 \text{ mol KTPB}/\text{mol K}_2\text{CO}_3) * (358.33 \text{ g KTPB}/\text{mol}) = 5.185 y$$

$$6.305 x + 5.185 y = 0.617 \text{ g}$$

$$\frac{1}{2} * (0.554 \text{ g KTPB}) * (\text{mol}/358.33 \text{ g KTPB}) * (\text{mol K}_2\text{CO}_3/2 \text{ mol KTPB}) * (138.21 \text{ g}/\text{mol K}_2\text{CO}_3) \\ = 0.05342 \text{ g K}_2\text{CO}_3 \text{ in } 25 \text{ mL of sample solution.}$$

$$\% \text{ K}_2\text{CO}_3 = 0.05342 \text{ g}/0.3688 \text{ g} * 100 = 14.48\%$$

$$y = 0.05342 \text{ g K}_2\text{CO}_3$$

$$6.305 x + 5.185 * 0.05342 \text{ g K}_2\text{CO}_3 = 0.617 \text{ g}$$

$$x = 0.05393 \text{ g NH}_4\text{Cl}$$

$$\% \text{ NH}_4\text{Cl} = 0.05393 \text{ g}/0.3688 \text{ g} * 100 = 14.62 \%$$

$$18] \text{ let } x = \text{mass Fe}_2\text{O}_3 \quad y = \text{mass Al}_2\text{O}_3$$

$$x + y = 2.019 \text{ g}$$

$$x * (\text{mol Fe}_2\text{O}_3/159.69 \text{ g}) * (2 \text{ mol Fe}/\text{mol Fe}_2\text{O}_3) * (55.85 \text{ g Fe}/\text{mol}) = 0.6995 x$$

$$0.6995 x + y = 1.774$$

$$y = 1.774 - 0.6995 x \quad \text{sub into } x + y = 2.019 \text{ g}$$

$$x + 1.774 - 0.6995 x = 2.019 \text{ g}$$

$$0.3005 x = 0.245 \text{ g}$$

$$x = 0.815 \text{ g Fe}_2\text{O}_3$$

$$\% \text{ Fe} = 0.815 \text{ g} / 2.019 \text{ g} * 100 = 40.4 \%$$