CHAPTER 4

55. $2AgNO_{3(aq)} + Na_2CrO_{4(aq)} \rightarrow 2NaNO_{3(aq)} + Ag_2CrO_{4(s)}$

75.0 mL ? g

0.100 M

$[Ag^+] = 1 \times 0.100\ M = 0.100\ M$

mol Ag^+ = (0.100 M)(0.0750 L) = 0.00750 mol Ag^+

NET IONIC Eqn: $2Ag^+_{(aq)} + CrO_4^{2-}{}_{(aq)} \rightarrow Ag_2CrO_{4(s)}$

0.00750 mol ?

$$\frac{0.00750\ mol\ Ag^+}{} \left| \frac{1\ mol\ CrO_4^{2-}}{2\ mol\ Ag^+} \right. = 0.00375\ mol\ CrO_4^{2-}$$

$$\frac{0.00375\ mol\ CrO_4^{2-}}{} \left| \frac{1\ mol\ Na_2CrO_4}{1\ mol\ CrO_4^{2-}} \right| \frac{161.98\ g\ Na_2CrO_4}{1\ mol\ Na_2CrO_4}$$

$= \boxed{0.607\ g\ Na_2CrO_4}$

★ Alternative Method - Do All Math in One "grid"

You know that all Ag^+ is consumed, thus all $AgNO_3$ is consumed making $AgNO_3$ the limiting reactant, which determines how much product is made & how much Na_2CrO_4 is needed.

$$\frac{0.00750\ mol\ AgNO_3}{} \left| \frac{1\ mol\ Na_2CrO_4}{2\ mol\ AgNO_3} \right| \frac{161.98\ g\ Na_2CrO_4}{1\ mol\ Na_2CrO_4} = \boxed{0.607\ g\ Na_2CrO_4}$$

CHAPTER 4

57. $Al(NO_3)_3(aq) + 3KOH(aq) \rightarrow 3KNO_3(aq) + Al(OH)_3(s)$

50.0 mL	200.0 mL	? g
0.200 M	0.100 M	

Limiting Reactant ?

$(0.200\ M\ Al(NO_3)_3)(0.0500\ L) = 0.0100\ mol\ Al(NO_3)_3$

$$\frac{0.0100\ mol\ Al(NO_3)_3}{} \left| \frac{1\ mol\ Al(OH)_3}{1\ mol\ Al(NO_3)_3} \right| \frac{78.00\ g\ Al(OH)_3}{1\ mol\ Al(OH)_3}$$

$= 0.780\ g\ Al(OH)_3$

$(0.100\ M\ KOH)(0.2000\ L) = 0.0200\ mol\ KOH$

compare

$$\frac{0.0200\ mol\ KOH}{} \left| \frac{1\ mol\ Al(OH)_3}{3\ mol\ KOH} \right| \frac{78.00\ g\ Al(OH)_3}{1\ mol\ Al(OH)_3}$$

$= \boxed{0.520\ g\ Al(OH)_3}$

Theoretical yield = Max Amt.

CHAPTER 4

59. $AgNO_{3(aq)} + NaBr_{(aq)} \rightarrow NaNO_{3(aq)} + AgBr_{(s)}$

100.0 mL	20.0 mL		? g
0.150 M	1.00 M		

LR?

$(0.150\ M\ AgNO_3)(0.1000\ L) = 0.0150\ mol\ AgNO_3$

$$\frac{0.0150\ mol\ AgNO_3}{} \left| \frac{1\ mol\ AgBr}{1\ mol\ AgNO_3} \right| \frac{187.8\ g\ AgBr}{1\ mol\ AgBr}$$

$= \boxed{2.82\ g\ AgBr}$ Theoretical yield = Max Amt.

$(1.00\ M\ NaBr)(0.0200\ L) = 0.0200\ mol\ NaBr$

compare

$$\frac{0.0200\ mol\ NaBr}{} \left| \frac{1\ mol\ AgBr}{1\ mol\ NaBr} \right| \frac{187.8\ g\ AgBr}{1\ mol\ AgBr}$$

$= 3.76\ g\ AgBr$