Name: KEY.

Chemistry 20
Solutions Workbook

5.2 ***Dissociation Equations***

Write the dissociation equation, including states, for each of the following substances:

1. sodium chloride

$NaCl_{(s)} \rightarrow Na^+_{(aq)} + Cl^-_{(aq)}$

* soluble ionic

2. hydrobromic acid

$HBr_{(s)} \rightarrow H^+_{(aq)} + Br^-_{(aq)}$

* acid

3. sodium hydroxide

$NaOH_{(s)} \rightarrow Na^+_{(aq)} + OH^-_{(aq)}$

* soluble ionic

4. nitrogen gas

$N_{2(g)} \rightarrow N_{2(g)}$

* non-polar molecular

5. potassium acetate

$KCH_3COO_{(s)} \rightarrow K^+_{(aq)} + CH_3COO^-_{(aq)}$

* soluble ionic

6. lithium fluoride

$LiF_{(s)} \rightarrow LiF_{(s)}$

* non-polar molecular

7. sodium dichromate

$Na_2Cr_2O_{7(s)} \longrightarrow 2Na^{+}_{(aq)} + Cr_2O_7^{2-}{}_{(aq)}$

* soluble ionic

8. solid hydrogen nitrate

$HNO_{3(s)} \longrightarrow H^{+}_{(aq)} + NO_3^{-}{}_{(aq)}$

* acid

9. iron (III) hydroxide

$FeOH_{3(s)} \longrightarrow FeOH_{3(s)}$

* non-soluble ionic

10. paraffin wax $C_{25}H_{52}(s)$

$C_{25}H_{52(s)} \longrightarrow C_{25}H_{52(s)}$

* non-polar molecular

11. copper (II) sulphate pentahydrate

$CuSO_4 \cdot 5H_2O_{(s)} \longrightarrow Cu^{2+}_{(aq)} + SO_4^{2-}{}_{(aq)}$

* soluble. ionic

12. glucose

$C_6H_{12}O_{6(s)} \longrightarrow C_6H_{12}O_{6(aq)}$

* polar molecular

Don't break down molecular compounds

5.2 -Non vs. Net Ionic Equations

Write the non, total and net ionic equations for each of the following reactions:

1. Solutions of sodium sulfide (aq) and iron(II) (s) sulfate are mixed.

$Na_2S_{(aq)} + FeSO_{4(aq)} \rightarrow Na_2SO_{4(aq)} + FeS_{(s)}$

$2Na^+_{(aq)} + S^{2-}_{(aq)} + Fe^{2+}_{(aq)} + SO_4^{2-}_{(aq)} \rightarrow 2Na^+_{(aq)} + SO_4^{2-}_{(aq)} + FeS_{(s)}$

$S^{2-}_{(aq)} + Fe^{2+}_{(aq)} \rightarrow FeS_{(s)}$

2. A solution of silver nitrate is poured onto a piece of copper. Cu^{2+}

$2AgNO_{3(aq)} + Cu_{(s)} \rightarrow Cu(NO_3)_{2(aq)} + 2Ag_{(s)}$

$2Ag^+_{(aq)} + 2NO_3^-{}_{(aq)} + Cu_{(s)} \rightarrow Cu^{2+}_{(aq)} + 2NO_3^-{}_{(aq)} + 2Ag_{(s)}$

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

3. Carbon dioxide gas is bubbled into lithium hydroxide solution to form water and lithium carbonate.

$CO_{2(g)} + 2LiOH_{(aq)} \rightarrow H_2O_{(l)} + Li_2CO_{3(aq)}$

$CO_{2(g)} + 2Li^+_{(aq)} + 2OH^-_{(aq)} \rightarrow 2Li^+_{(aq)} + CO_3^{2-}{}_{(aq)} + H_2O_{(l)}$

$CO_{2(g)} + 2OH^-_{(aq)} \rightarrow CO_3^{2-}{}_{(aq)} + H_2O_{(l)}$

4. Solutions of sodium carbonate and calcium nitrate are mixed.

$$Na_2CO_{3(aq)} + Ca(NO_3)_{2(aq)} \rightarrow 2\,NaNO_{3(aq)} + CaCO_{3(s)}$$

$$2Na^{+}_{(aq)} + CO_3^{2-}{}_{(aq)} + Ca^{2+}_{(aq)} + 2NO_3^{-}{}_{(aq)} \rightarrow 2Na^{+}_{(aq)} + 2NO_3^{-}{}_{(aq)} + CaCO_{3(s)}$$

$$CO_3^{2-}{}_{(aq)} + Ca^{2+}_{(aq)} \rightarrow CaCO_{3(s)}$$

5. Cadmium metal is added to a solution of cobalt(III) nitrate.

$$3Cd_{(s)} + 2Co(NO_3)_{3(aq)} \rightarrow 2Co_{(s)} + 3Cd(NO_3)_{2(aq)}$$

$$3Cd_{(s)} + 2Co^{3+}_{(aq)} + 6NO_3^{-}{}_{(aq)} \rightarrow 2Co_{(s)} + 3Cd^{2+}_{(aq)} + 6NO_3^{-}{}_{(aq)}$$

$$3Cd_{(s)} + 2Co^{3+}_{(aq)} \rightarrow 2Co_{(s)} + 3Cd^{2+}_{(aq)}$$

6. Calcium metal is added to water.

$$Ca_{(s)} + 2HOH_{(l)} \rightarrow Ca(OH)_{2(s)} + H_{2(g)}$$

5.3- Concentration

1. What is the molar concentration of a solution in which 0.240 mol of washing soda, $Na_2CO_3 \cdot 10\ H_2O$, is dissolved in water to make 0.500 L of a solution for softening water. **(0.480 mol/L)**

c=?
V=0.5L
n=0.24mol

$c = \frac{n}{V}$

$= \frac{0.24}{0.5}$

$= 0.48$

$c = 0.480 mol/L$

2. What is the molar concentration of 500 mL of a solution that contains 12.7 g of swimming pool chlorinator, calcium hypochlorite? **(0.177 mol/L)**

c=?
V=0.5L
n=12.7g
M=142.98g/mol
n=?

$Ca(OCl)_2$

$n = \frac{m}{M}$

$= \frac{12.7}{142.98} = 0.0888... mol$

$c = \frac{n}{V}$

$= \frac{0.0888}{0.5}$

$= 0.17764...$

$c = 0.178 mol/L$

3. How many moles of solid sodium hydrogen carbonate would be needed to make 0.100 L of a 0.600 mol/L solution suitable for use as an antacid? **(0.0600mol)**

n=?
c=0.6mol/L
V=0.1L

$c = \frac{n}{V}$

$n = cV$

$= 0.6 \times 0.1$

$= 0.06 mol$

$n = 0.0600 mol$

NaOH

4. What mass of sodium hydroxide (lye) must be added to 1.50 L of water in order to prepare a solution with a concentration of 0.0750 mol/L? **(4.50g)**

$m = ?$ $\quad c = \frac{n}{V}$

$V = 1.5L$ $\quad n = cV$

$= 0.0750 mol/L$ $\quad = 0.075 \times 1.5$

$n = 0.1125 mol$

$M = 40 g/mol$

$n = \frac{m}{M}$

$m = nM$

$= 0.1125 \times 40$

$= 4.2$

$m = 4.50g$

5. Calculate the volume of 0.100 mol/L solution that can be prepared from 3.60 mmol of caustic soda. **(3.6×10^{-2}L)**

$V = ?$ $\quad c = \frac{n}{V}$

$c = 0.1 mol/L$ $\quad V = \frac{n}{c}$

$n = 3.6 \div 1000$ $\quad = \frac{0.0036}{0.1}$

$n = 0.0036 mol$ $\quad = 0.036L$

$V = 3.6 \times 10^{-2} L$

6. What volume of 0.700 mol/L brush cleaning solution can be prepared from 126 g of sodium phosphate, $Na_3PO_{4(s)}$? **(1.10L)**

$V = ?$ $\quad c = \frac{n}{V}$

$c = 0.7 mol/L$ $\quad V = \frac{n}{c}$

$= 126g$ $\quad = \frac{0.766}{0.7}$

$M = 163.94 g/mol$ $\quad = 1.0979...$

$n = ?$ $\quad n = \frac{m}{M}$

$= \frac{126}{163.94}$

$n = 0.7685... mol$

$V = 1.10L$

7. Calculate the molar concentration of an ink solution that contains 0.210 mol of iron(II) sulphate dissolved in 480 mL of water. **(0.438 mol/L)**

c=?
n=0.210mol
=0.48L

$c = \frac{n}{V}$

$= \frac{0.21}{0.48}$

$= 0.4375 \text{ mol/L}$

$c = 0.438 \text{ mol/L}$

8. The protective coating on a car battery terminal can be prepared by dissolving 0.240 kg of sodium silicate in water to make 250 mL of solution. What is the molar concentration of this solution? **(7.86 mol/L)**

Na_2SiO_3

c=?
V=0.25L
n=240g
=122.07g/mol

$c = \frac{n}{V}$

$= \frac{1.966}{0.25}$

$= 7.8643\ldots$

$c = 7.86 \text{ mol/L}$

$n = \frac{m}{M}$

$= \frac{240}{122.07}$ $n = 1.9660 \text{ mol}$

9. Sodium phosphate can be used to remove scale deposits from a car radiator. What volume of a 0.075 mol/L solution would contain 1.10 mol of sodium phosphate? **(14.7 mol/L)**

V=?
=0.075mol/L
=1.1mol

$c = \frac{n}{V}$

$V = \frac{n}{c}$

$= \frac{1.1}{0.075}$

$= 14.6 \text{ L}$

$V = 14.7 \text{ L}$

10. A 0.100 mol/L solution of zinc nitrate is needed for a chemistry lab. What is the mass of zinc nitrate necessary to produce 250 mL of this solution? **(4.74 mol/L)** $Zn(NO_3)_2$

c=0.1mol/L
m=?
V=0.25
n=?
M=189.43g/mol

$c = \frac{n}{V}$

$n = cV$

$= 0.1 \times 0.25$

$n = 0.025$ mol

$n = \frac{m}{M}$

$m = nM$

$= 0.025 \times 189.43$

$= 4.7357...$

$m = 4.74$ mol/L

5.4 -*Solution Preparation*

1. A hydrate of sodium thiosulphate known as *hypo* ($Na_2S_2O_3 \cdot 5\ H_2O$) is used as a fixer in photography because it readily dissolves silver compounds. Describe how to prepare 100 mL of a 0.120 mol/L *hypo* solution.

=0.1
=0.12mol/L
=248.22g/mol
=cV n=nM
=0.12×0.1
n=0.012mol
m=0.012×248.22
m=2.97864
m=2.98

① Measure 2.98g of $Na_2S_2O_3 \cdot 5H_2O_{(s)}$.

② Dissolve the $Na_2S_2O_3 \cdot 5H_2O_{(s)}$ in 50 mL of distilled water.

③ Transfer to 100mL volumetric flask.

④ Fill flask to 100mL and mix by inverting.

$Na^+ \quad HCO_3^- \quad Na.HCO_3$

2. Sodium hydrogen carbonate is used in baking as baking soda, or as one of the components of baking powder. Describe how to prepare 250 mL of a 0.821 mol/L solution of hydrogen carbonate.

V=0.25L
c=0.821mol/L
M=84.01g/mol
n=cV mol/L
=0.821×0.25
n=0.2052 mol
n=0.205×84.01
n=21.961..

m=17.2g

① Measure 17.2g of $NaHCO_{3(s)}$.
② Dissolve in 125mL of water.
③ Transfer into 250mL volumetric flask.
④ Fill flask to 250mL with water, invert to mix.

3. Ammonium carbonate is a suitable replacement for the aqueous solution of ammonia as a household cleaning agent. Describe how to prepare 1.00 L of a 0.450 mol/L solution of ammonium carbonate.

$(NH_4)_2CO_{3(s)}$ m=43.2g

c=0.450mol/L
V=1L
M=96.11g/mol
n=cV mol/L
n=0.45×1
n=0.45mol
m=0.45×96.1
m=43.24g

① Measure 43.2g of $(NH_4)_2CO_{3(s)}$.
② Dissolve in 500mL.
③ Transfer to a 1L volumetric flask.
④ Fill flask to 1L with water and invert to mix.

4. Pots, kettles and frying pans and other non-aluminum household utensils can be economically cleaned of grease by using a solution of lye (sodium hydroxide). Describe how to prepare 2.50 L of a 0.100 mol/L solution of lye.

$NaOH_{(s)}$

$V = 2.5L$

$c = 0.1 mol/L$

$1 = 40 g/mol$

$c = n/V$

$1 = 2.5 \times 0.1$

$1 = 0.25 mol$

$n = 0.25 \times 40$

$m = 10g$

① Measure out 10g of $NaOH_{(s)}$

② Dissolve in 1250mL of water.

③ Transfer to a 2.5L volumetric flask

④ Fill flask to 2.5L and mix by inverting.

5.4 - ***Dilution of Solutions***

1. Determine the volume of concentrated hydrochloric acid (11.6 mol/L) required to prepare 10.0 L of a 0.200 mol/L solution. **(0.172 L)**

$V_i = ?$ $\quad V_iC_i = V_fC_f$ $\quad \frac{10 \times 0.2}{11.6}$

$C_i = 11.6\ mol/L$ $\quad V_i = \frac{V_fC_f}{C_i}$

$V_f = 10\ L$ $\quad = 0.1724...$ $\quad \boxed{V_i = 0.172\ L}$

$C_f = 0.2\ mol/L$

2. What volume of 14.8 mol/L ammonia is required to prepare 2.0 L of a 1.0 mol/L solution? **(0.14 L)**

$V_i = ?$

$C_i = 14.8\ mol/L$ $\quad V_i = \frac{V_fC_f}{C_i}$ $\quad \boxed{V_i = 0.14\ L}$

$V_f = 2\ L$ $\quad \frac{2 \times 1.0}{14.8}$

$C_f = 1.0\ mol/L$

$= 0.1351...$

3. What is the molar concentration of a sodium hydroxide solution prepared when 10 L of 19.1 mol/L solution is diluted to 400 L? **(0.48 mol/L)**

$C_f = ?$ $\quad V_iC_i = V_fC_f$

$V_f = 400\ L$ $\quad \frac{V_iC_i}{V_f} = C_f$ $\quad \boxed{C_f = 0.48\ mol/L}$

$V_i = 10\ L$

$C_i = 19.1\ mol/L$ $\quad \frac{10 \times 19.1}{400}$

$= 0.477...$

4. To what volume must 10.0 mL of 17.2 mol/L ethanol be diluted in order to prepare a 10.3 mol/L ethanol solution? **(1.67×10^{-2} L)**

$V_i = 0.010\ L$ $\quad V_iC_i = V_fC_f$ $\quad \boxed{V_f = 1.67 \times 10^{-2}\ L}$

$C_i = 17.2\ mol/L$ $\quad \frac{V_iC_i}{C_f} = V_f$

$V_f = ?$

$C_f = 10.3\ mol/L$ $\quad \frac{0.01 \times 17.2}{10.3}$ $\quad = 0.01666...$

5. What is the molar concentration of household ammonia solution if 7.5 mL are diluted to 0.250 L to make a 0.021 mol/L solution? **(0.70 mol/L)**

$C_i = ?$

$V_i = 0.0075\,L$

$V_f = 0.25\,L$

$c_f = 0.021\,mol/L$

$V_i C_i = V_f C_f$

$C_i = \frac{V_f C_f}{V_i}$

$\frac{0.25 \times 0.021}{0.0075}$

$= 0.7$

$C_i = 0.70\,mol/L$

6. To what volume must 60 L of a 2.50 mol/L toxic solution be diluted to in order to make the final concentration 1.00×10^{-6} mol/L (a fairly safe concentration)? **(1.5×10^8 L)**

$V_f = ?$

$V_i = 60\,L$

$C_i = 2.50\,mol/L$

$c_f = 1.00 \times 10^{-6}\,mol/L$

$V_i C_i = V_f c_f$

$\frac{V_i C_i}{c_f} = V_f$

$\frac{60 \times 2.5}{(1.00 \times 10^{-6})}$

$= 1.5 \times 10^8$

$V_f = 1.5 \times 10^8\,L$

5.4 - *Concentration of Ions in Solution*

1. Calculate the ion concentrations in a 0.090 mol/L solution of Na_3PO_4. **(0.270 mol/L & 0.09mol/L)**

$1\,Na_3PO_{4(aq)} \rightarrow 3\,Na^+_{(aq)} + 1\,PO_4^{-3}{}_{(aq)}$

$c = 0.090\,mol/L$ | $0.090 \times \frac{3}{1}$ | $0.090 \times \frac{1}{1}$

$c = 0.27\,mol/L$ | $c = 0.090\,mol/L$

2. Calculate the ion concentrations in a 0.0143 mol/L solution of $NaHCO_3$. **(0.0143 mol/L & 0.0143 mol/L)**

$NaHCO_{3(aq)} \rightarrow Na^+_{(aq)} + HCO_3^-{}_{(aq)}$

$c = 0.0143\,mol/L$ | $0.0143 \times \frac{1}{1}$ | $0.0143 \times \frac{1}{1}$

$c = 0.0143\,mol/L$ | $c = 0.0143\,mol/L$

3. Calculate the ion concentrations in a 2.50 mol/L solution of calcium hydroxide. **(2.50 mol/L & 5.00 mol/L)**

$1\,Ca(OH)_{2(aq)} \rightarrow 1\,Ca^{2+}_{(aq)} + 2\,OH^-_{(aq)}$

$c = 2.50\,mol/L$ | $2.50 \times \frac{1}{1}$ | $2.50 \times \frac{2}{1}$

$c = 2.50\,mol/L$ | $c = 5.00\,mol/L$

4. Calculate the ion concentrations in a solution prepared by dissolving 800 g of zinc chloride in 4.50 L of water. **(1.30mol/L & 2.60mol/L)**

$c = ?$

$n = 800\,g$

$= 4.5\,L$

$c = \frac{n}{V}$

$\frac{5.868}{4.5}$

$c = 1.304\,mol/L$

$1\,ZnCl_{2(aq)} \rightarrow 1\,Zn^{2+}_{(aq)} + 2\,Cl^-_{(aq)}$

$c = 1.304\,mol/L$ | $1.304 \times \frac{1}{1}$ | $1.304 \times \frac{2}{1}$

$c = 1.30\,mol/L$ | $c = 2.61\,mol/L$

$? = 136.31\,mol/g$

$= \frac{n}{M}$

$\frac{800}{136.31}$

$n = 5.8689\,mol$

5. Calculate the ion concentrations in a solution prepared by dissolving 7.50 mg of aluminum sulphate in 1.00 L of water. **(4.38×10^{-5} mol/L & 6.57×10^{-5}mol/L)**

$c = ?$ $V = 1L$ $m = 0.0075g$ $M = 342.17 g/mol$ $c = 2.19\times10^{-5} mol/L$

$n = \frac{m}{M}$ $\frac{0.0075}{342.17} = 2.1918\times10^{-5} mol$

$c = \frac{n}{V}$ $\frac{2.1919\times10^{-5}}{1}$

$1\,Al_2(SO_4)_{3(aq)} \rightarrow 2\,Al^{3+}_{(aq)} + 3\,SO_4^{2-}{}_{(aq)}$

$c = 2.19\times10^{-5} mol/L$

$2.19\times10^{-5}\times\frac{2}{1}$ $c = 4.38\times10^{-5} mol/L$

$2.19\times10^{-5}\times\frac{3}{1}$ $c = 6.58\times10^{-5} mol/L$

6. Calculate the concentration of dissolved Na_2CO_3 necessary to give a 0.500 mol/L $CO_3^{2-}{}_{(aq)}$ concentration. **(0.50mol/L)**

$1\,Na_2CO_{3(aq)} \rightarrow 2\,Na^{+}_{(aq)} + 1\,CO_3^{2-}{}_{(aq)}$

$0.5\times\frac{1}{1}$ $c = 0.500\ mol/L$

$c = 0.500 mol/L$

7. Calculate the concentration of dissolved $(NH_4)_2SO_4$ necessary to give a 1.20 mol/L $NH_4^{+}{}_{(aq)}$ concentration. **(0.600mol/L)**

$1\,(NH_4)_2SO_{4(aq)} \rightarrow 2\,NH_4^{+}{}_{(aq)} + 1\,SO_4^{2-}{}_{(aq)}$

$1.2\times\frac{1}{2}$ $c = 1.20 mol/L$

$c = 0.600 mol/L$

8. Calculate the concentration of dissolved $K_2Cr_2O_7$ necessary to give a 0.600 mol/L $Cr_2O_7^{2-}{}_{(aq)}$ concentration. **(0.600mol/L)**

$1\,K_2Cr_2O_{7(aq)} \rightarrow 2\,K^{+}_{(aq)} + 1\,Cr_2O_7^{2-}{}_{(aq)}$

$0.6\times\frac{1}{1}$ $c = 0.600 mol/L$

$c = 0.600 mol/L$

9. What mass of calcium chloride is required to prepare 2.000 L of 0.120 mol/L $Cl^-_{(aq)}$ solution? **(13.3g)**

$m = ?$ $c = \frac{n}{V}$

$= 2L$ $n = cv$

0.06×2

$? \quad n = 0.12 mol$

$0.06 mol/L$

$CaCl_{2(aq)} \rightarrow Ca^{2+}_{(aq)} + 2Cl^-_{(aq)}$

$0.12 \times \frac{1}{2}$ $0.12 mol/L = c$

$C = 0.06 mol/L$

$1 = 110.99 g/mol$

$n = \frac{m}{n}$

$m = nM$

0.12×110.98 $\boxed{m = 13.3g}$

$= 13.317...$

Qualitative Analysis

1. Identify each of the following ions based on the information given (use Table 7.2 on page 265 to help you):

   (a) the transition metal with a blue colour in solution and a blue flame colour

   Cu

   (b) alkali metal with a yellow flame

   Na Na

   (c) with no flame colour but a purple colour in solution

   MnO_4^-

   (d) metal with a blue-white flame but no solution colour

   Pb Pb

2. How could you tell the difference between the following solutions by looking at them?

(a) $FeCl_3(aq)$ and $FeCl_2(aq)$

Fe^{3+} is yellow or yellow-brown and Fe^{2+} is colorless or pale green.

(b) $Cr(NO_3)_3(aq)$ and $Cr(NO_3)_2(aq)$

Cr^{2+} is pale or dark blue, Cr^{3+} is green or blue-green.

(c) $K_2Cr_2O_7(aq)$ and $K_2CrO_4(aq)$

$Cr_2O_7^{2-}$ is orange and CrO_4^{2-} is yellow.

(d) $MnCl_2(aq)$ and $KMnO_4(aq)$

Mn^{2+} is colorless or pale pink and MnO_4^- is purple-pink or a deep purple.

5. What solution could you choose in each case to distinguish between each of the pairs of solutions given by using precipitation?

(a) $Sr(NO_3)_2(aq)$ and $K(NO_3)$ (aq) NaOH

$Sr^{2+} + 2OH^- \rightarrow Sr(OH)_{2(s)}$

$K^+ + OH^- \rightarrow KOH_{(aq)}$

(b) $NaNO_3(aq)$ and $Ca(NO_3)_2(aq)$

$SO_4^{2-}{}_{(aq)} + 2NaNO_3 \rightarrow Na_2SO_{4(aq)} + 2NO_3^-{}_{(aq)}$

$SO_4^{2-}{}_{(aq)} + Ca(NO_3)_{2(aq)} \rightarrow CaSO_{4(s)} + 2NO_3^-{}_{(aq)}$

(c) $AgClO_3(aq)$ and $NaClO_3(aq)$

$Cl^-_{(aq)} + AgClO_{3(aq)} \rightarrow AgCl_{(s)} + ClO_3^-{}_{(aq)}$

$Cl^-_{(aq)} + NaClO_{3(aq)} \rightarrow NaCl_{(aq)} + ClO_3^-{}_{(aq)}$

3. How many colours could you make fireworks if you had access to only alkali metals? List the ions and their colours in your answer.

Li^+ - bright red.

Na^+ - bright yellow

K^+ - violet

Rb^+ - violet

Cs^+ - violet

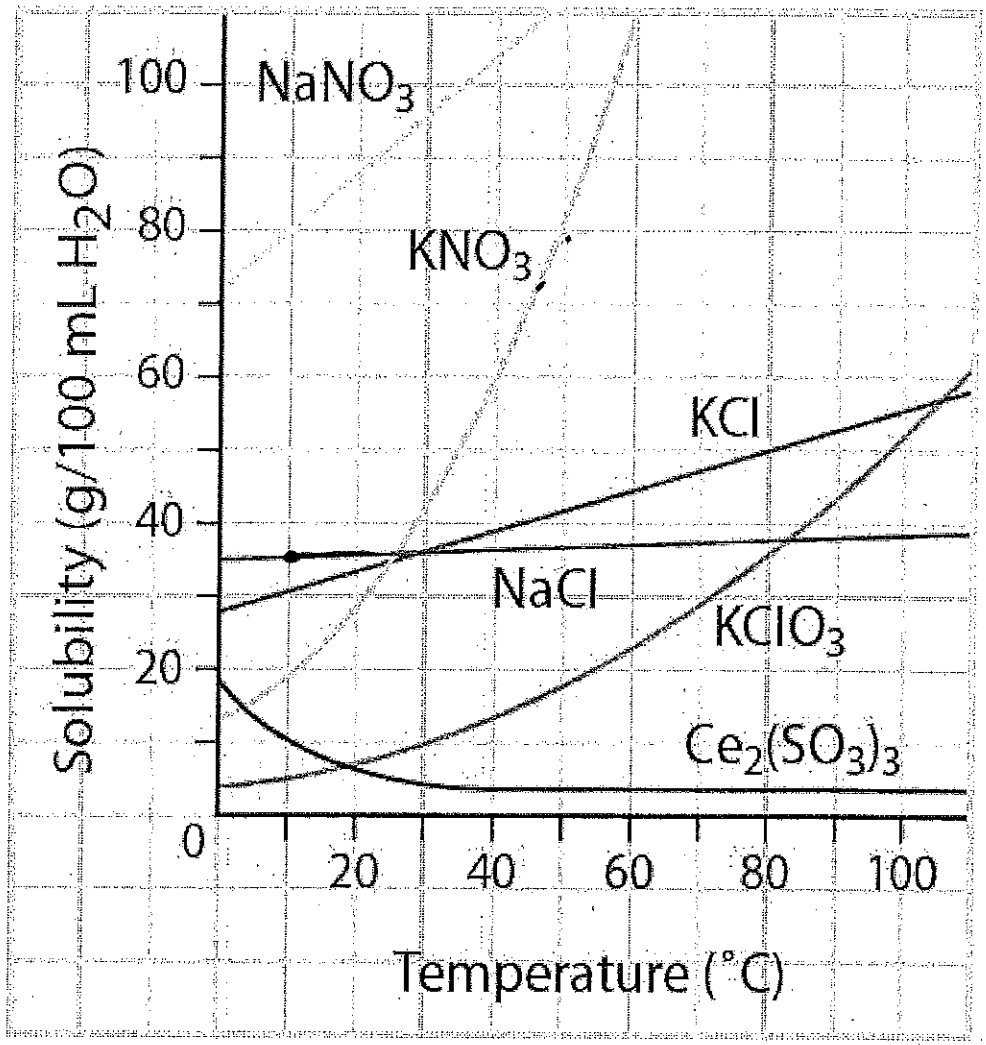
You could only have three different colors; red, yellow and violet.

4. If a firework is red, which alkali metal(s) could be responsible?

Li^+ - Lithium

Solubility

Title: _____



This graph shows the solubility of various substances plotted against the temperature of the solution. Please answer the following questions using the graph.

1. What is the manipulated variable?
   Temperature in °C
2. What is the responding variable?
   Solubility (g/100mL of H_2O)
3. Give the graph an appropriate title. RV vs. MV
   Solubility in g/100mL in H_2O vs Temperature in °C.

4. Which substance is the most soluble at 15°C?

$NaNO_3$

5. Which substance is the least soluble at 15°C?

$KClO_3$

6. Which substance decreases in solubility as temperature increases?

$Ce_2(SO_3)_3$

7. What mass of sodium chloride will dissolve in 100 mL of water at 10°C?

35g / 100mL

8. At what temperature is the solubility of sodium nitrate equal to 80 g/100 mL H_2O?

10°C

9. What minimum temperature is required to dissolve 30 g of potassium chlorate in 100 mL of water?

70°C

10. What minimum temperature is required to dissolve 30 g of potassium nitrate in 50 mL of water?

40°C 60g 100mL

11. If 20 mL of a saturated solution of potassium nitrate at 50°C is cooled to 20°C, approximately what mass of solid would crystallize out of the solution?

20°C = 30g/100mL = 6g/20mL 66 - 16 = 10

50°C = 80g/100mL = 16g/20mL 10g

Review Assignment:
p. 204 textbook #1-26 omit 15, 16, 17
p.175 #7 top of page