Date: Name: ANSWERS Class:

Reinforcement

Chapter 9

BLM 9-4

Precipitation Reaction Predictions

Goal To practice using solubility guidelines to predict the formation of precipitates.

What To Do Using the general solubility guidelines from your text write YES if a precipitate forms and NO if a precipitate does not form.

Set A

	$Ba(NO_3)_2$	$BaCl_2$	Na_2CrO_4	$NaNO_3$	K_2CrO_4	KCl
$Ba(NO_3)_2$	NO	NO	YES	NO	YES	NO
$BaCl_2$	NO	NO	YES	NO	YES	NO
Na_2CrO_4	YES	NO	NO	NO	NO	NO
$NaNO_3$	NO	NO	NO	NO	NO	NO
K_2CrO_4	YES	NO	NO	NO	NO	NO
KCl	NO	NO	NO	NO	NO	NO

Set B

	Na_2SO_4	$MgCl_2$	$Al_2(SO_4)_3$	$Ba(NO_3)_2$	$Sr(NO_3)_2$	$AlCl_3$
Na_2SO_4	NO	NO	NO	YES	YES	NO
$MgCl_2$	NO	NO	NO	NO	NO	NO
$Al_2(SO_4)_3$	NO	NO	NO	YES	YES	NO
$Ba(NO_3)_2$	YES	NO	YES	NO	NO	NO
$Sr(NO_3)_2$	YES	NO	YES	NO	NO	NO
$AlCl_3$	NO	NO	NO	NO	NO	NO

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Chapter 9

BLM 9-2

Polyatomic Ions

Goal To practice naming and writing formulas of polyatomic ions.

What To Do Answer each question in the space provided.

1. Name the following compounds containing polyatomic ions.
   - (a) $CrSO_4$ chromium (II) sulphate
   - (b) $Al(NO_3)_3$ aluminum nitrate
   - (c) $(NH_4)_3PO_4$ ammonium phosphate
   - (d) $AgIO_3$ silver iodate
   - (e) $HgClO_3$ mercury (I) chlorate
   - (f) $ZnCO_3$ zinc carbonate
   - (g) $Ni(NO_3)_3$ nickel (III) nitrate
   - (h) $Ba(BrO_3)_2$ barium bromate
   - (i) $BeCO_3$ beryllium carbonate
2. Write formulas for the following ionic compounds.
   - (a) Iron(III) chlorate $Fe(ClO_3)_3$
   - (b) Mercury(I) iodate $HgIO_3$
   - (c) Aluminum sulfate $Al_2(SO_4)_3$
   - (d) Lead(II) carbonate $PbCO_3$
   - (e) Ammonium phosphate $(NH_4)_3PO_4$
   - (f) Calcium nitrate $Ca(NO_3)_2$
   - (g) Potassium permanganate $KMnO_4$
   - (h) Silver fluorate $AgFO_3$
   - (i) Strontium sulfate $SrSO_4$
   - (j) Sodium chromate Na_2CrO_4

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Chapter 9

BLM 9-5

Writing Ionic Equations and Net-Ionic Equations

Goal To practice writing ionic and net-ionic equations.

What To Do Using your solubility guidelines, decide which of the following combinations of ionic compounds will produce an insoluble precipitate. Write an ionic equation and net-ionic equation for each. Pick out the spectator ions. If no precipitate forms, write NR.

1. Zinc chloride + sodium phosphate → $3ZnCl_2$ $2Na_3PO_4$ $Zn_3(PO_4)_2(s) + 6NaCl$
   Ionic equation: _____
   Net-ionic equation: $3Zn^{2+}(aq) + 2PO_4^{3-}(aq) \rightarrow Zn_3(PO_4)_2(s)$
   Spectator ions: $6Na^{+1}(aq)$, $6Cl^{-1}(aq)$
2. Lead(II) nitrate + sodium sulfide → $Pb(NO_3)_2$ + Na_2SO_4 $PbS(s) + 2NaNO_3(aq)$
   Ionic equation: _____
   Net-ionic equation: $Pb^{2+}(aq) + S^{2-}(aq) \rightarrow PbS(s)$
   Spectator ions: $2Na^{+1}(aq)$, $2NO_3^{-1}(aq)$
3. Calcium chloride + ammonium hydroxide → $CaCl_2(aq)$ $2NH_4OH(aq)$ $Ca(OH)_2(s) + 2NH_4Cl(aq)$
   Ionic equation: _____
   Net-ionic equation: $Ca^{2+}(aq) + 2OH^{-}(aq) \rightarrow Ca(OH)_2(s)$
   Spectator ions: $2NH_4^{+1}(aq)$, $2Cl^{-1}(aq)$
4. Magnesium chloride + iron(III)nitrate → $3MgCl_2(aq)$ $2Fe(NO_3)_3(aq)$ $3Mg(NO_3)_2(aq) + 2FeCl_3(s)$
   Ionic equation: _____
   Net-ionic equation: $2Fe^{3+}(aq) + 6Cl^{-}(aq) \rightarrow 2FeCl_3(s)$
   Spectator ions: $3Mg^{2+}(aq)$, $6NO_3^{-1}(aq)$
5. Iron(III) sulfate + lead(II) chlorate → $Fe_2(SO_4)_3$ $3Pb(ClO_3)_2$ $2Fe(ClO_3)_3(aq) + 3PbSO_4(s)$
   Ionic equation: _____
   Net-ionic equation: $Pb^{2+}(aq) + SO_4^{2-}(aq) \rightarrow PbSO_4(s)$
   Spectator ions: $2Fe^{3+}(aq)$, $6ClO_3^{-1}(aq)$

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Vocabulary Check

Chapter 9

BLM 9-6

Solution Terminology

Goal To practice using solution terminology.

What To Do Choose the correct term for each blank space from the list at the bottom of the page.

1. The experimental evidence that NaCl in aqueous solution is a(n) conductor tells us that this salt is an electrolyte.
2. $Fe^{3+}_{(aq)} + 3Cl^{-}_{(aq)} + 3Na^{+}_{(aq)} + 3OH^{-}_{(aq)} \rightarrow Fe(OH)_{3(s)} + 3Na^{+}_{(aq)} + 3Cl^{-}_{(aq)}$ is an example of a(n) ionic equation.
3. In the preceding question, the ions which do not participate in the reaction are called spectator ions.
4. Since potassium chloride is a(n) salt, it exists in water solution almost completely as ions.
5. Flame tests can be used to identify many metallic ions in solution.
6. Spectator ions are not included in a(n) net ionic equations
7. Soluble generally means that more than 1 g of solute will dissolve in 100 mL of water at room temperature.
8. The bond between small ions is stronger than the bond between large ions with the same charge.
9. Fluoride ions are less soluble than chlorides, bromides and iodides because the fluoride ion is smaller.
10. The appearance of a precipitate indicates that an insoluble compound is present.
11. Insoluble means that the solubility is less than 0.1 g per 100 mL water.
12. Double displacement reactions can be recognized by the formation of a precipitate, gas or water.

~~conductor~~	~~double displacement~~	~~net ionic equation~~
~~ionic equation~~	~~metallic~~	~~soluble~~
~~insoluble~~	~~stronger~~	~~less soluble~~
~~precipitate~~	~~salt~~	~~spectator~~

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