P H4 (pg 1 of 2)

Single Replacement Reactions Oxidation-Reduction Rxs

Name_____Per___

If a reaction occurs, write an overall balanced equation to represent the following single replacement reactions. Then turn the overall equation into a net ionic equation.
Remember, not all combinations result in a replacement. Refer to NoteSheet H4 for assistance.

1. iron is dropped into lead(IV) sulfate [if a Rx occurs, assume iron(III) forms]

2. aluminum is combined with lead(II) nitrate

3. magnesium is dropped into aluminum acetate

4. copper is combined with silver chloride [if a Rx occurs, assume copper(II) forms]

5. iron metal is dropped into tin(II) acetate [if a Rx occurs, assume iron(II) forms]

6. copper is combined with iron(III) sulfate [if a Rx occurs, assume copper(II) forms]

7. aluminum is combined with iron(II) chloride.

8. copper is combined with a solution of barium hydroxide [if a Rx occurs, assume copper(I) forms]

9. nickel metal is dropped into tin(II) acetate [if a Rx occurs, assume nickel(III) forms]

10. nickel is combined with zinc(II) sulfate. [if a Rx occurs, assume nickel(II) forms]

11. sodium is dropped into water.

12. water is poured over a lump of calcium.

13. iron is dropped into water [if a Rx occurs, assume iron(III) forms]

14. zinc is reacted with sulfuric acid (H_2SO_4 , *strong* acid)

15. potassium is dropped into lead sulfide and water.

16. aluminum is dropped into carbonic acid (H_2CO_3, *weak* acid).

17. silver is dropped into aqueous hydrochloric acid (HCl, *strong* acid)

18. barium is dropped into water.

Check the NS G4 to learn how to deal with halogen replacement.

19. chlorine gas is combined with sodium iodide.

20. fluorine gas is added to calcium bromide.

21. liquid bromine is poured over calcium fluoride.

22. chlorine gas is combined with sodium iodide.

1. lead(IV) sulfate is not soluble therefore no replacement can occur = NR

2. $2\ Al_{(s)} + 3\ Pb(NO_3)_{2(aq)} \rightarrow 3\ Pb_{(s)} + 2\ Al(NO_3)_{3(aq)}$
   net ionic: $2\ Al + 3\ Pb^{2+} \rightarrow 3\ Pb + 2\ Al^{3+}$

3. $3\ Mg_{(s)} + 2\ Al(C_2H_3O_2)_{3(aq)} \rightarrow 3\ Mg(C_2H_3O_2)_{2(aq)} + 2\ Al_{(s)}$
   net ionic: $3\ Mg + 2\ Al^{3+} \rightarrow 3\ Mg^{2+} + 2\ Al$

4. silver chloride is not soluble therefore no replacement can occur = NR

5. $Fe_{(s)} + Sn(C_2H_3O_2)_{2(aq)} \rightarrow Sn_{(s)} + Fe(C_2H_3O_2)_2$
   net ionic: $Fe + Sn^{2+} \rightarrow Sn_{(s)} + Fe^{2+}$

6. copper is less active than iron therefore no replacement can occur = NR

7. $2\ Al_{(s)} + 3\ FeCl_{2(aq)} \rightarrow 3\ Fe_{(s)} + 2\ AlCl_{3(aq)}$
   net ionic: $2\ Al + 3\ Fe^{2+} \rightarrow 3\ Fe + 2\ Al^{3+}$

8. barium hydroxide is slightly soluble so you can assume that some dissolves and the replacement could occur, however barium is far more active than copper and will remain in compound form leaving copper as a metal and unable to replace the barium = NR

9. $2\ Ni_{(s)} + 3\ Sn(C_2H_3O_2)_{2(aq)} \rightarrow 3\ Sn_{(s)} + 2\ Ni(C_2H_3O_2)_{3(aq)}$
   net ionic: $2\ Ni + 3\ Sn^{2+} \rightarrow 3\ Sn + 2\ Ni^{3+}$

10. Nickel is less active than zinc therefore no replacement can occur = NR.

11. $2\ Na_{(s)} + 2\ H_2O_{(L)} \rightarrow 2\ NaOH_{(aq)} + H_{2(g)}$
    net ionic is the same

12. $Ca_{(s)} + 2\ H_2O_{(L)} \rightarrow Ca(OH)_{2(s)} + H_{2(g)}$
    net ionic is the same

13. See the * note to the side of the activity series. Iron is not able to replace H from water therefore = NR.

14. $Zn_{(s)} + H_2SO_{4(aq)} \rightarrow ZnSO_{4(aq)} + H_{2(g)}$ (remember, zinc is always +2, and sulfuric is a strong acid)
    net ionic: $Zn + 2\ H^+ \rightarrow Zn^{2+} + H_2$

15. The lead sulfide plays no role in the replacement because it is insoluble, but the potassium reacts with the water.
    $2\ K_{(s)} + 2\ H_2O_{(L)} \rightarrow 2\ KOH + H_2$
    net ionic is the same

16. $2\ Al_{(s)} + 3\ H_2CO_{3(aq)} \rightarrow Al_2(CO_3)_{3(ppt)} + 3\ H_{2(g)}$
    net ionic is the same because carbonic acid is weak, it is not separated into ions)

17. Silver is lower on the activity series and is less active than hydrogen therefore = NR.

18. $Ba_{(s)} + 2\ H_2O_{(l)} \rightarrow Ba(OH)_{2(s)} + H_2$
    net ionic is the same

19. $Cl_{2(g)} + 2\ NaI_{(s)} \rightarrow I_{2(s)} + 2\ NaCl_{(s)}$
    net ionic is the same

20. $F_{2(g)} + CaBr_{2(s)} \rightarrow Br_{2(l)} + CaF_{2(s)}$
    net ionic is the same

21. Since bromine is lower on the periodic chart than fluorine it is less active and therefore can not replace = NR

22. $Cl_{2(g)} + 2\ NaI_{(s)} \rightarrow I_{2(s)} + 2\ NaCl_{(s)}$
    net ionic is the same