Name: _____

Chapter 8

Single Replacement Reactions

Single replacement reactions are reactions that involve an element replacing one part of a compound. The products include the displaced element and a new compound. An element can only replace another element that is less active than itself.

General activity series for metals

(most active) Li Ca Na Mg Al Zn Fe Pb [H_2] Cu Ag Pt *(least active)*

General activity series for nonmetals

(most active) F_2 Cl_2 Br_2 I_2 *(least active)*

Here are some common types of single replacement reactions.

Active metals replace less active metals from their compounds in aqueous solution.

example Magnesium turnings are added to a solution of iron(III) chloride.

$3Mg + 2FeCl_3 \longrightarrow 2Fe + 3MgCl_2$

Active metals replace hydrogen in water.

example Sodium is added to water.

$2Na + 2HOH \longrightarrow H_2 + 2NaOH$

Active metals replace hydrogen in acids.

example Lithium is added to hydrochloric acid.

$2Li + 2HCl \longrightarrow H_2 + 2LiCl$

Active nonmetals replace less active nonmetals from their compounds in aqueous solution.

example Chlorine gas is bubbled into a solution of potassium iodide.

$Cl_2 + 2KI \longrightarrow I_2 + 2KCl$

If a less reactive element is combined with a more reactive element in compound form, there will be no resulting reaction.

example Chlorine gas is bubbled into a solution of potassium fluoride.

$Cl_2 + KF \longrightarrow$ no reaction

example Zinc is added to a solution of sodium chloride.

$Zn + NaCl \longrightarrow$ no reaction

Complete Like # 2

Show who is Reduced and who is Oxidized

ROUND 3

Exercise 8–1: Using the activity series, predict and balance the following single replacement reactions. Use abbreviations to indicate the appropriate phase of reactants and products where possible.
Note: Not all of the reactions will occur. For those that do not, write no reaction.

Use ARROW To Show Movement of Electrons

1. A piece of copper is dropped into a container of water.

2. Liquid bromine is added to a container of sodium iodide crystals.

$$\overset{0}{Br_{2(\ell)}} + \overset{+1\ -1}{2NaI_{(s)}} \longrightarrow \overset{+1\ -1}{2NaBr_{(s)}} + \overset{0}{I_{2(s)}}$$

2e⁻ ; Reduced ; Oxidized

3. An aluminum strip is immersed in a solution of silver nitrate.

4. Zinc pellets are added to a sulfuric acid solution.

5. Fluorine gas is bubbled into a solution of aluminum chloride.

6. Magnesium turnings are added to a solution of lead(II) acetate.

7. Iodine crystals are added to a solution of sodium chloride.

8. Calcium metal is added to a solution of nitrous acid.

9. A pea-sized piece of lithium is added to water.

10. A solution of iron(III) chloride is poured over a piece of platinum wire.

Note: On the AP reaction prediction section, all reactions "work"; in other words there will be no "No reactions" on the AP Exam.