

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 [H₂] Cu Ag Pt (least active)

General activity series for nonmetals

(most active) F₂ Cl₂ Br₂ I₂ (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.



Active metals replace hydrogen in water.

example Sodium is added to water.



Active metals replace hydrogen in acids.

example Lithium is added to hydrochloric acid.



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

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



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.



example Zinc is added to a solution of sodium chloride.



Complete like # 2

ROUND 3

Show who is reduced
and who is oxidized

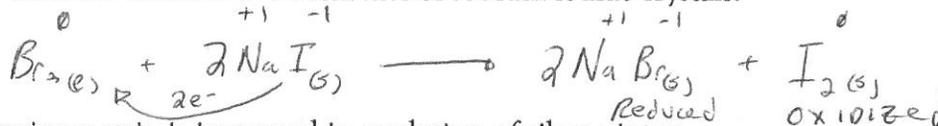
Exercise 8-1: Using the activity series, predict and balance the following single replacement reactions. Use abbreviations to indicate the appropriate phase of reactants and products where possible.

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.



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.