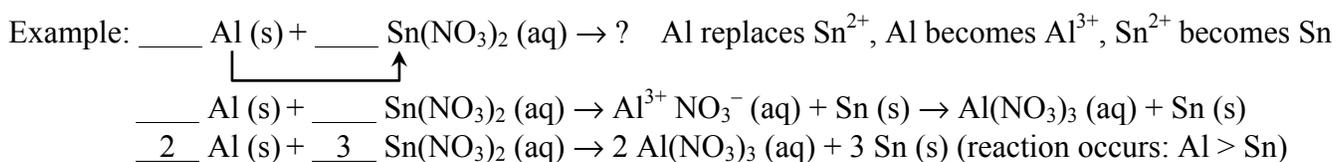


Single Replacement Reaction Products

- Take the elemental reactant and swap it with the similar element in the reactant compound:
 - Metal or hydrogen (H_2 gas) replaces metal ion or hydrogen ion (H^+) in the compound (Type 1)
 - Halogen (F_2 , Cl_2 , Br_2 , I_2) replaces halide ion (F^- , Cl^- , Br^- , I^-) in compound (Type 2)
- Write the correct formulas for the products (leave old subscripts behind!):
 - Determine the charge that the replacing element will have in the product (use the periodic table or the Activity Series [Chart E]).
 - Determine the charge on the unchanged ion and criss-cross the charges to make neutral.
 - Write the replaced ion as an element (its charge is 0). Remember, HOFBrINCl's must be diatomic if they are by themselves.
- Write the correct states and balance the reaction.
- Look at the Activity Series (Chart E) to determine if the replacement can happen:
 - The reaction occurs if the free element is more reactive (higher) than the ion it would replace.
 - For halogens, $F_2 > Cl_2 > Br_2 > I_2$ (i.e. F_2 can replace any halogen, I_2 can replace none).
 - If the reaction will occur, you are done; if the cannot occur, write **N.R.** ("no reaction").



Assuming the reaction occurs, determine the products and write the balanced equations for the following single-replacement reactions, including state symbols. Based on the element activity series in Chart E or the Halogen family, determine if the reaction occurs & write N.R. after the reaction if it cannot occur.

- $\underline{\quad} Zn(s) + \underline{\quad} CuSO_4(aq) \rightarrow$
- $\underline{\quad} Cl_2(g) + \underline{\quad} KI(aq) \rightarrow$
- $\underline{\quad} Zn(s) + \underline{\quad} HCl(aq) \rightarrow$
- $\underline{\quad} Ni(s) + \underline{\quad} MgSO_4(aq) \rightarrow$
- $\underline{\quad} Br_2(l) + \underline{\quad} CaCl_2(aq) \rightarrow$

For the following word equations, first determine the formulas for the reactants, then complete the single replacement reaction as above.

- Pellets of zinc metal are placed into a solution of magnesium sulfate.

7. A chunk of iron metal reacts with a solution of nickel(II) nitrate.

8. A strip of magnesium is placed into aqueous aluminum chloride.

9. Chlorine gas is bubbled through a solution of strontium bromide.

10. Copper foil is submerged into a solution of lead(II) nitrate.