

Single & Double Displacement

What is “displacement”?

- it's an exchange/replacement with something else

These two types of reactions occur with *ionic compounds*.

Remember Ionic Compounds

- ❑ Ionic compounds combine a metal with a nonmetal, and the *metal always comes first*
- ❑ Ionic compounds dissolve in water & separate

In displacement reactions only metals can displace metals and only nonmetals can displace nonmetals. This is due to the charge of their outer orbit/valence.

Hydrogen is unusual because it's a nonmetal, but carries a positive charge, so it can displace (and be displaced) by *metals*.

Single Displacement

- Only ONE element or polyatomic ion is displaced.



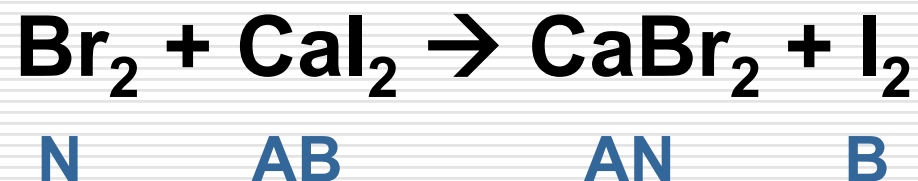
AND/OR



In these generic equations, A & M are metals, and B & N are nonmetals.

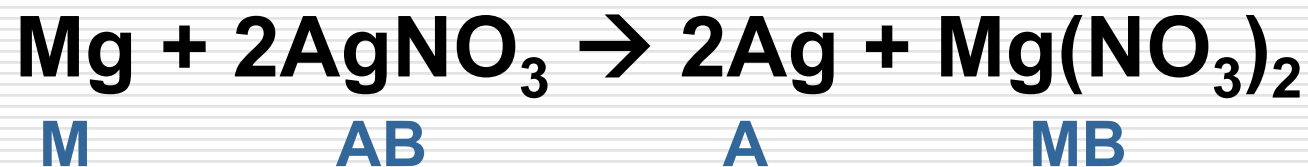
Single Displacement

Example 1:



bromine displaces the other nonmetal, iodine

Example 2:



magnesium displaces the other metal, silver

Double Displacement

What do you think will happen?



- 2 elements or polyatomic ions will be displaced (often, they are exchanged for one another)

Example:



Double Displacement

In double displacement reactions, two things can occur:

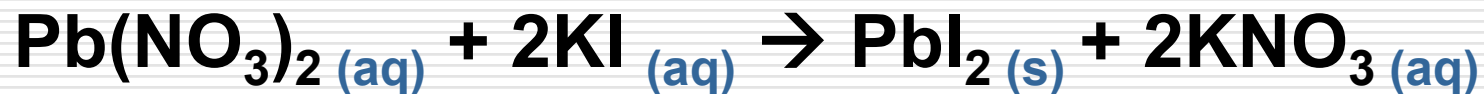
- 1. an acid reacts with a base to produce a salt and water**
 - 2. a solid/precipitate forms in the solution (turns cloudy or actual particles form)**
-

Double Displacement

Terminology:

- ❑ (“g”) for “gas”
- ❑ (“l”) for “liquid”
- ❑ (“aq”) for “aqueous”, meaning in water solution
- ❑ (“s”) for “solid” when a precipitate forms

Our Example:



In Conclusion...

- Displacement reactions occur in ionic compounds
- Metals switch with metals or other positively-charged ions (like hydrogen)
- Nonmetals switch with nonmetals or other negatively-charged ions
- Single displacement involves a compound and an element
- Double displacement involves two compounds