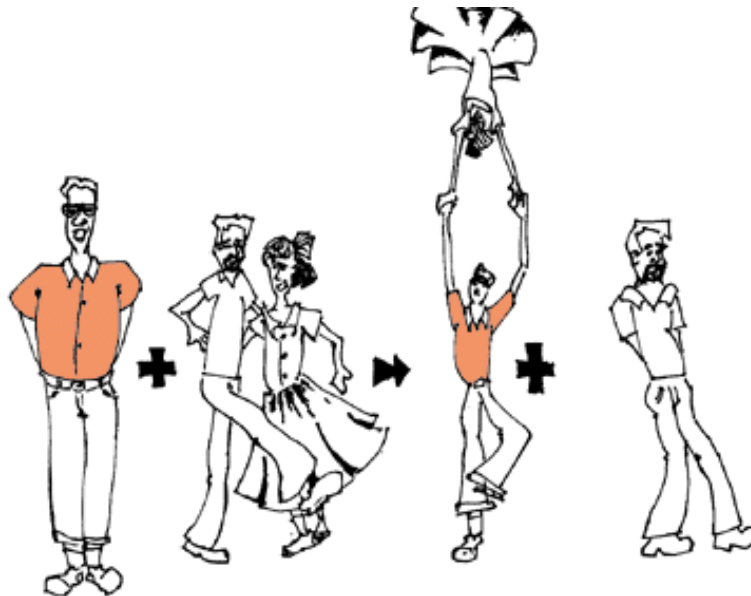




Displacement of Metals

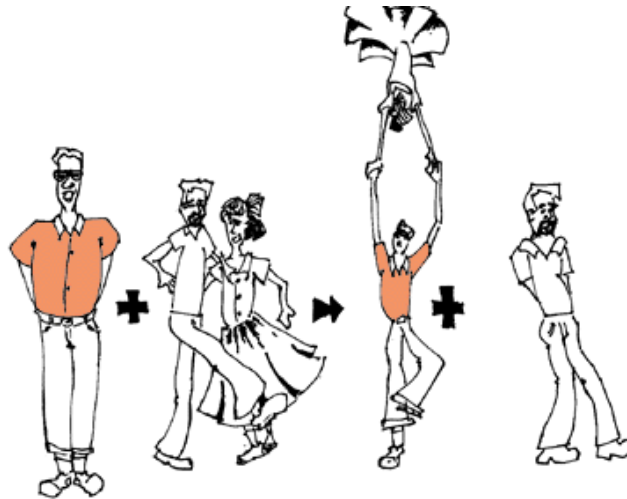
Single Replacement Reactions

- Single Replacement Reactions occur when one element replaces another in a compound.



Single Replacement Reactions

- A metal can replace a metal (+) OR a nonmetal can replace a nonmetal (-).





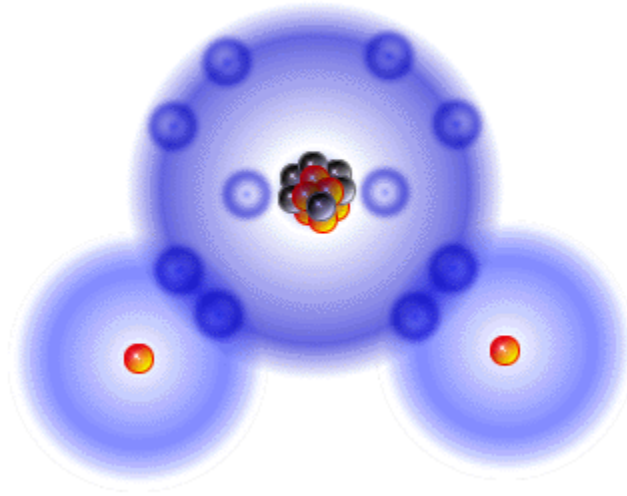
Single Replacement Reactions

- element + compound → product + product
 - $A + BC \rightarrow AC + B$ (if A is a metal)
OR
 - $A + BC \rightarrow BA + C$ (if A is a nonmetal)
- (remember the cation always goes first!)

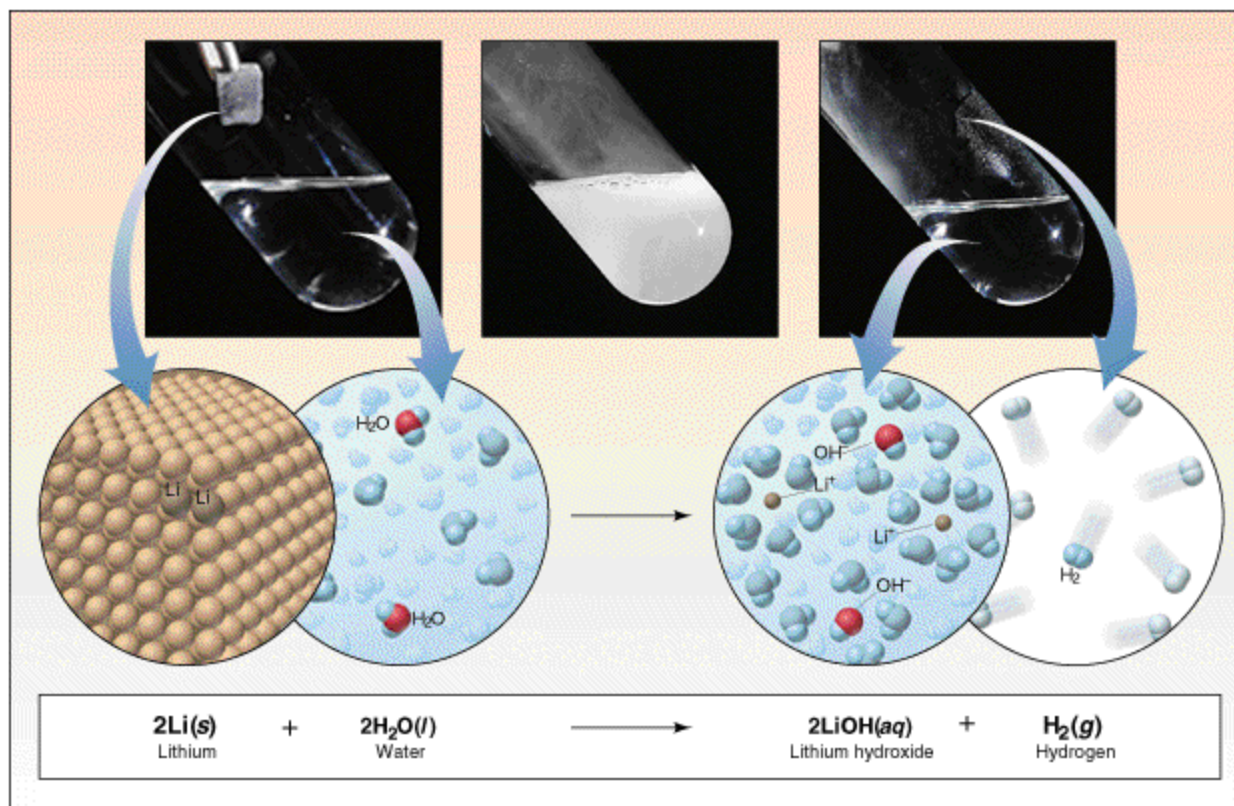
Single Replacement Reactions

- When H_2O splits into ions, it splits into H^+ and OH^- (not H^+ and O^{2-} !!)

Water Molecule



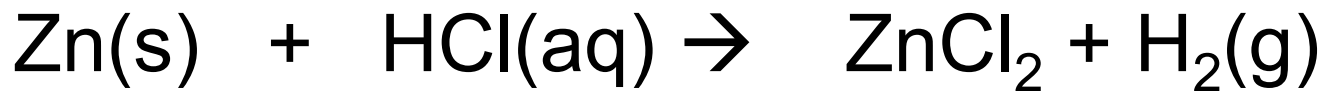
Single Replacement Reactions





Single Replacement Reactions

- Write and balance the following single replacement reaction equation:
- Zinc metal reacts with aqueous hydrochloric acid

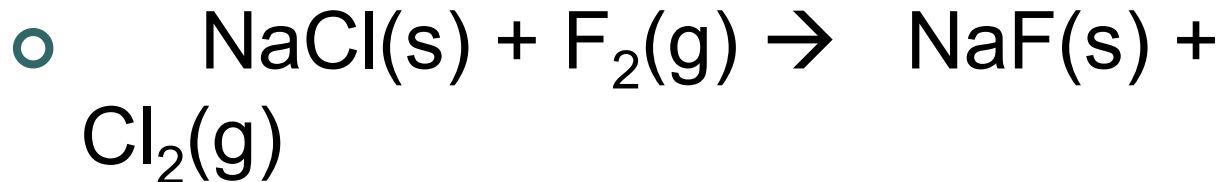


- Note: Zinc replaces the hydrogen ion in the reaction



Single Replacement Reactions

- Sodium chloride solid reacts with fluorine gas



- Note that fluorine replaces chlorine in the compound

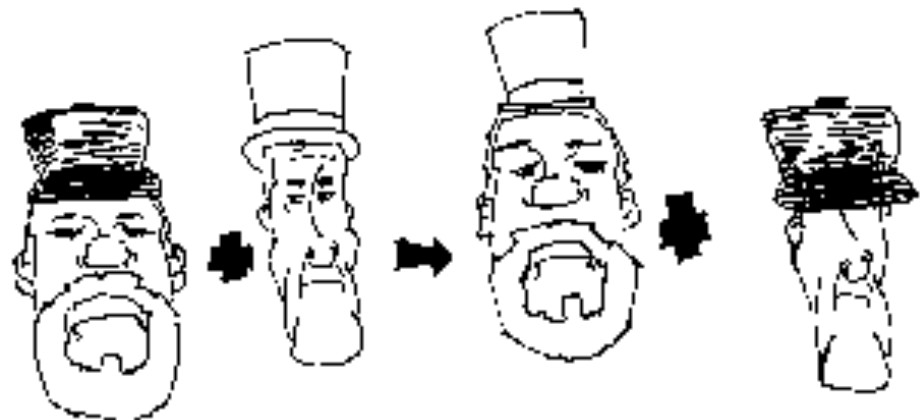


Single Replacement Reactions

- Aluminum metal reacts with aqueous copper (II) nitrate
- $$\text{Al(s)} + \text{Cu(NO}_3)_2(\text{aq}) \rightarrow \text{Al(NO}_3)_3(\text{aq}) + \text{Cu(s)}$$

4. Double Replacement Reactions

- Double Replacement Reactions occur when a metal replaces a metal in a compound and a nonmetal replaces a nonmetal in a compound
- Compound + compound \rightarrow product + product
- $AB + CD \rightarrow AD$





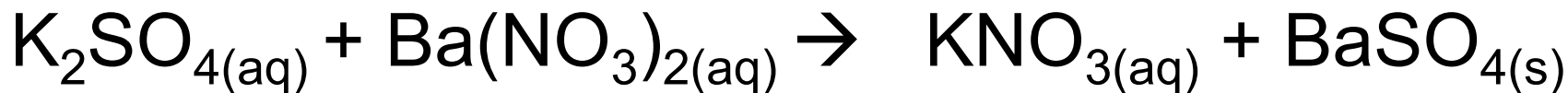
Double Replacement Reactions

- Think about it like “foil”ing in algebra, first and last ions go together + inside ions go together

- Example:



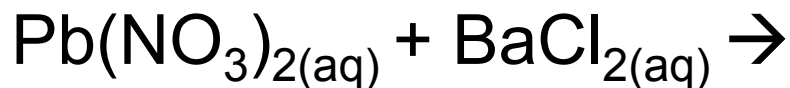
- Another example:





Practice

• Predict the products. Balance the equation





Practice

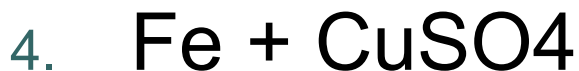
- Answers

1. $\text{HCl}_{(aq)} + \text{AgNO}_{3(aq)} \rightarrow$
2. $\text{CaCl}_{2(aq)} + \text{Na}_3\text{PO}_{4(aq)} \rightarrow$
3. $\text{Pb}(\text{NO}_3)_{2(aq)} + \text{BaCl}_{2(aq)} \rightarrow$
4. $\text{FeCl}_{3(aq)} + \text{NaOH}_{(aq)} \rightarrow$
5. $\text{H}_2\text{SO}_{4(aq)} + \text{NaOH}_{(aq)} \rightarrow$
6. $\text{KOH}_{(aq)} + \text{CuSO}_{4(aq)} \rightarrow$



Practice

○ Is there a reaction





Practice

○ Answers

