# Rules for Writing Net-IONIC Equations

1. STRONG ELECTROLYTES ARE WRITTEN IN THEIR IONIC FORM ($M^{++} + 2X^-$)
   a. soluble salts
   b. strong acids: HCl, $HNO_3$, $H_2SO_4$, $HClO_4$, HBr, HI
   c. strong, soluble bases: NaOH, $Ba(OH)_2$, KOH
2. WEAK ELECTROLYTES ARE WRITTEN IN THEIR MOLECULAR FORM ($MZ_2$)
   a. weak acids: e.g. $HC_2H_3O_2$, $H_2CO_3$, HCN, $H_3PO_4$
   b. weak bases: $NH_4OH$
3. ADDITIONAL SUBSTANCES WRITTEN IN THEIR MOLECULAR FORM
   a. insoluble substances: e.g. $AgCl_{(s)}$ * NOTE (s) after formula
   b. non-electrolytes: e.g. $H_2O$
   c. gases: e.g. $CO_2$
   d. complex ions: e.g. $Ag(NH_3)_2^+$
4. Equations must be balanced, both in atoms and in electrical charge.
5. The Net-Ionic equation should include only those substances that have undergone a chemical change. Do not include spectator ions.

EXAMPLES:

a. Total Ionic: $Na^+ + OH^- + H^+ + Cl^- \longrightarrow Na^+ + Cl^- + H_2O$
   NET-IONIC: $H^+ + OH^- \longrightarrow H_2O$

b. Total: $Na^+ + OH^- + HC_2H_3O_2 \longrightarrow Na^+ + C_2H_3O_2^- + H_2O$
   NET: $OH^- + HC_2H_3O_2 \longrightarrow C_2H_3O_2^- + H_2O$

c. $Pb^{++} + \cancel{2NO_3^-} + \cancel{2K^+} + CrO_4^{-2} \longrightarrow PbCrO_{4(s)} + \cancel{2K^+} + \cancel{2NO_3^-}$

d. $Mg_{(s)} + 2H^+ + \cancel{2Cl^-} \longrightarrow Mg^{+2} + H_{2(g)} + \cancel{2Cl^-}$ redox

PRACTICE:

a. addition of hydrochloric acid to a soln. of sodium acetate
b. addition of ammonium hydroxide to acetic acid
c. addition of hydrochloric acid to a solution of $AgNO_3$
d. sulfuric acid is added to a solution of barium chloride - ($BaSO_4$ is insoluble.)

ANSWERS: NET-IONIC

a. $H^+ + C_2H_3O_2^- \longrightarrow HC_2H_3O_2$
b. $NH_4OH + HC_2H_3O_2 \longrightarrow NH_4^+ + C_2H_3O_2^- + H_2O$
c. $Ag^+ + Cl^- \longrightarrow AgCl_{(s)}$
d. $Ba^{+2} + SO_4^{-2} \longrightarrow BaSO_{4(s)}$