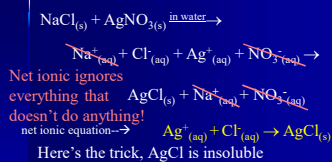


### Ionic interactions

- When you dissolve 2 or more ionic compounds in water some parts of it may react together and precipitate out
- Precipitate-solid falling out of solution
- More times than not, most (if not all) of the ions do nothing
- Net ionic equations are only concerned with the ions that do something

### This goes back to ionic dissociation in water



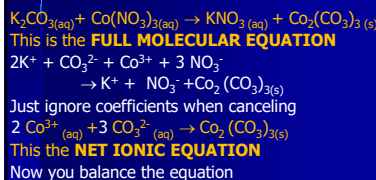
### More net ionic equ.

- You normally write the reactants as aqueous (since you are dissolving them)
  - $\text{Mg}(\text{NO}_3)_2(aq) + \text{Na}_2\text{CO}_3(aq) \rightarrow \text{MgCO}_3(s) + 2\text{NaNO}_3(aq)$
  - Dissociate everything that is aqueous, not solid
  - $\text{Mg}^{++} + 2\text{NO}_3^- + 2\text{Na}^+ + \text{CO}_3^{--}$  The remaining part is the net
  - $\rightarrow \text{MgCO}_3(s) + 2\text{Na}^+ + 2\text{NO}_3^-$  ionic equation
  - Now cancel out everything that is the same on both sides of the equation
  - These are called **spectator ions**
- $$\text{Mg}^{++} + \text{CO}_3^{--} \rightarrow \text{MgCO}_3(s)$$

### What if nothing precipitates out?

- $\text{K}_2\text{SO}_4(aq) + \text{NaNO}_3(aq) \rightarrow \text{KNO}_3(aq) + \text{Na}_2\text{SO}_4(aq)$
- (by the way, this equation isn't balanced)
- $2\text{K}^+ + \text{SO}_4^{2-} + \text{Na}^+ + \text{NO}_3^-$
- $\rightarrow \text{K}^+ + \text{NO}_3^- + 2\text{Na}^+ + \text{SO}_4^{2-}$
- Everything cancels out
- There is no net ionic equation

### Practice with equations that are not yet balanced



### Tip to make sure your answer is right

- Make sure you have the same atoms on each side of the equation
- If your final answer is something like  $\text{K}^+ + \text{CO}_3^{2-} \rightarrow \text{CaCO}_3(s)$
- It is wrong!!!
- Atoms don't spontaneously change into other atoms (without a nuclear reaction)

### Solubility rules

- Rules to determine if something is soluble (will stay dissolved--aq-- or when it is insoluble (will precipitate out, become a solid--s--)
- You will be able to use the solubility rules sheet on the test.

### Soluble Compounds

- All compounds of **Group 1** are soluble except LiF, Li<sub>2</sub>S, and Cs<sub>2</sub>S.
- All **ammonium** (NH<sub>4</sub>) compounds are soluble.
- All **acetates** (CH<sub>3</sub>COO) are soluble except Fe<sup>3+</sup>
- All **nitrates** (NO<sub>3</sub>), and **chlorates** (ClO<sub>3</sub>) are soluble.

### Soluble Compounds cont.

- All binary compounds of the **halogens** (other than F) with metals are soluble, except those of Silver, Mercury, and Lead. Fluorides are insoluble except for rule 1 and 2.
- All **sulfates** are soluble except those of barium, strontium, calcium, silver, mercury, and lead.

### Insoluble Compounds

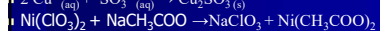
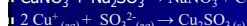
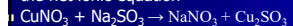
- Except for rule 1 and 2, **carbonates, oxalates, sulfites, chromates, oxides, silicates, and phosphates** are insoluble.
- Except for rule 1 and 2 **hydroxides** are insoluble except Ba, Sr, and Ca
- Except for rule 1 and 2, **Sulfides** are insoluble except for calcium, barium, strontium, magnesium.

### Examples

■ $K_3N$	■ (aq)	$K_2CrO_4$	■ (aq)
■ $Na_2CO_3$	■ (aq)	$BaSO_3$	■ (s)
■ $Li_2S$	■ (s)	$(NH_4)_3PO_4$	■ (aq)
■ $NH_4NO_3$	■ (aq)	$FeSiO_3$	■ (s)
■ $Mg(NO_3)_2$	■ (aq)	$CuO$	■ (s)
■ $AgClO_3$	■ (aq)	$NaOH$	■ (aq)
■ $AgCl$	■ (s)	$Ba(OH)_2$	■ (aq)
■ $CuF_2$	■ (s)	$Ni(OH)_2$	■ (s)
■ $CrSO_4$	■ (aq)	$MgS$	■ (aq)
■ $CaSO_4$	■ (s)	$BeS$	■ (s)

### Net Ionic Equations

Identify what is soluble or insoluble and write the net ionic equation



No net ionic equation

