



Net Ionic Equations

Many chemical reactions involve ionic substances that dissolve in water but not all the ions change during these aqueous reactions. So, chemists rewrite these reactions to include only those ions that change. **The ions that are left out are called spectator ions and the new equation is called a net ionic equation.**

The process for writing a net ionic equation is not very complicated but it does require you to know which ionic substances are soluble in water. To help you learn this information a list of solubility rules has been established. **MEMORIZE THESE RULES!!**

Solubility of Ionic Compounds in Water

- All sodium, potassium, and ammonium (NH₄⁺) compounds are soluble.
- All nitrates and chlorates are soluble.
- All acetates are soluble except AgCH₃COO
- All common chlorides, bromides and iodides are soluble except those of silver, mercury(I), and lead. [Lead(II) chloride is soluble in hot water.]
- All common sulfates are soluble except those of calcium, strontium, barium and lead.
- All common carbonates, phosphates, oxides and silicates are insoluble except those of group IA and ammonium.
- All common sulfides are insoluble except those of groups IA and IIA and ammonium.
- All common hydroxides (-OH) are insoluble except those of group IA, barium and strontium.

Dissociation

Ionic substances that dissolve in water, strong acids and strong bases are said to **dissociate** when dissolved in water. This is simply the compound breaking down into ions. Weak acids and weak bases do not dissociate in water very well, but they do break down somewhat (about 5%) and this process is referred to as **ionization**. Even some molecular compounds will ionize slightly, especially organic acids.

CAVEAT: MEMORIZE THESE!!

STRONG ACIDS

hydrochloric acid
 hydrobromic acid
 hydroiodic acid
 perchloric acid
 chloric acid
 nitric acid
 sulfuric acid

WEAK ACIDS

phosphoric acid
 hydrofluoric acid
 acetic acid
 carbonic acid

STRONG BASES

Group IA hydroxides
 barium hydroxide
 strontium hydroxide
 calcium hydroxide

WEAK BASES

ammonia

EXAMPLE

Write the equation for the dissolution of sodium chloride in water.



Practice

DIRECTIONS: Write the equation for the dissolution of the following compounds.

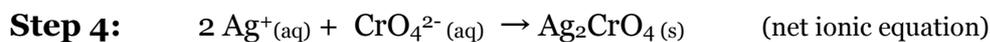
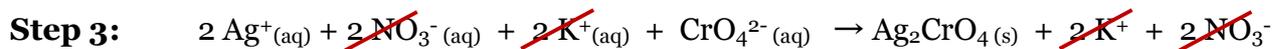
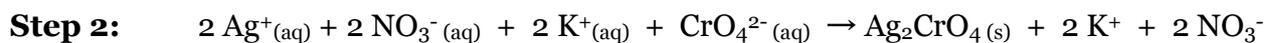
1. barium hydroxide
2. calcium chloride
3. sodium hydroxide
4. acetic acid
5. methanol

Steps to Writing Net Ionic Equations

1. Write the complete molecular equation.
2. Then write the total ionic equation.
3. Cross out the spectator ions.
4. Write the net ionic equation.

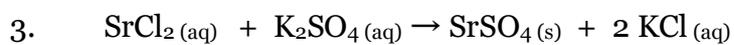
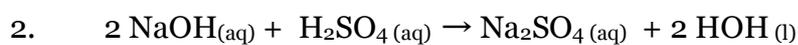
EXAMPLE

Write the net ionic equation for the reaction when silver nitrate is added to potassium chromate to produce silver chromate potassium nitrate.



PRACTICE

DIRECTIONS: Write the total ionic equation, cross out the spectator ions, and write the net ionic equation.



“Heart is what separates the good from the great.” –Michael Jordan