

Writing Net Ionic Equations

Net Ionic Equations

- indicate only the species that are reacting
- not all species in a BCE react
- some species are present but just "watch" the other species react

Information you are to memorize:

Some substances when dissolved in water (**aqueous solutions**) break up into ions 100 % of the time.

e.g. $\text{AlCl}_3(\text{aq}) \rightarrow$ _____

The substances that break up 100 % of the time are:

1) **ionic compounds** _____ e.g. _____

2) **strong acids** _____

HCl	HNO ₃
HBr	HClO ₃
HI	HClO ₄
	H ₂ SO ₄

3) **strong bases** _____

LiOH	Ca(OH) ₂
NaOH	Sr(OH) ₂
KOH	Ba(OH) ₂
RbOH	
CsOH	

Any other soluble (aqueous) ionic, acidic or basic substances **DO NOT** split up 100 % of the time.

Any soluble (aqueous) covalent substances **DO NOT** split up ever in water.

e.g. $I_2(aq)$, $C_2H_5OH(aq)$, $C_{12}H_{22}O_{11}(aq)$ etc

Solids, Liquids and Gases DO NOT split up! They are **NOT** aqueous.

*Certain products are unstable and break apart upon formation. Two important ones that you must remember are H_2CO_3 , a weak acid that breaks up into $H_2O(l)$ and $CO_2(g)$ and NH_4OH , a weak base that breaks up into $H_2O(l)$ and $NH_3(g)$. There is absolutely no experimental evidence for the **EXISTENCE** of discrete molecules of either carbonic acid or ammonium hydroxide. They cannot be isolated and crystallized.*

Rules for writing Net Ionic Equations

- 1) Write the **BCE** with the proper subjects.

BCE

- 2) Eliminate any species that is not aqueous.
- 3) Determine whether each aqueous species is a **strong acid** (SA) or **strong base** (SB) or a **salt/ionic compound** (I).
- 4) Separate all the compounds checked in Step 3 into ions.

This is the **Ionic Equation** (IE).

IE

5) Cross out any species that is common to both sides. The species must be **identical!!!!**

This is the **Net Ionic Equation (NIE)**.

_NIE_____

The NIE indicates the species which are reacting.

The crossed out species are **SPECTATORS** -- they are present but do not react.

Examples of Spectators: