LO: Students will be able to use solubility rules to determine full ionic and net ionic equations.

DOL: Students will correctly solve net ionic equations at least 4/5 times.

Mar 29-7:34 AM

Ionic Chemical Equation for solution chemistry.

When water soluble compounds are dissolved in water, they are no longer solid compounds but are instead aqueous ions.

Let's consider this balanced chemical equation:

$Cd(NO_3)_2 + (NH_4)_2S \longrightarrow CdS + 2NH_4NO_3$

Based on solubility rules, all of the compounds are soluble except for cadmium sulfide so the equation now becomes:

$Cd(NO_3)_2(aq) + (NH_4)_2S(aq) \longrightarrow CdS(s) + 2NH_4(aq)$

The reactants can be broken down as follows:

$Cd^{2+}(aq) + 2NO_3^-(aq) + 2NH_4^+(aq) + S^{2-}(aq)$

notice that the ions must have their charges displayed and the subscripts outside the parentheses become coefficients

The products will be broken down like this:

$CdS(s) + 2NH_4^+ + 2NO_3^-$

Note that the cadmium sulfide does NOT separate into ions because it is insoluble.

Net Ionic Equations

an equation in which only those compounds and ions that undergo a chemical change in a reaction in an aqueous solution

Start with the ionic version of the balanced equation (from the last 2 slides)...

$Cd^{2+}(aq) + 2NO_3^-(aq) + 2NH_4^+(aq) + S^{2-}(aq) \longrightarrow$

$CdS(s) + 2NO_3^-(aq) + 2NH_4^+(aq)$

Notice that some ions are the same on both sides of the equation. These ions did not undergo any chemical change, hence they are called *spectator ions.* To write the **net ionic equation**, simply remove the ones that are the same on both sides.

$Cd^{2+}(aq) + S^{2-}(aq) \longrightarrow CdS(s)$

Mar 29-8:07 AM

_____ $NaCl(aq)$ + _____ $Pb(NO_3)_2(aq)$ → _____ $PbCl_2(s)$ + _____ $NaNO_3(aq)$

_____ $Na_2CO_3(aq)$ + _____ $FeCl_2(aq)$ → _____ $FeCO_3(s)$ + _____ $NaCl(aq)$

_____$Mg(OH)_2(aq)$ + _____$HCl(aq)$ → _____$MgCl_2(aq)$ + _____$H_2O(l)$