

Communicating Information in Chemical Equations

States of matter can be communicated in a balanced chemical equation.

(s) = solid

(l) = liquid

(g) = gas

(aq) = aqueous (in solution -- dissolved in water)

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Ionic Equations

-- used for ions that are in aqueous solutions

-- different from chemical equations because it shows the substances as ions in the equation

-- will almost always be double replacement reactions

-- precipitate: insoluble solid, will not dissolve in water

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Ionic Equations

Types

complete ionic equation: shows all the particles in the solution as they exist

net ionic equation: include only the particles that participate in the equation

Vocab

spectator ions: ions that do not participate in the reaction

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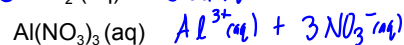
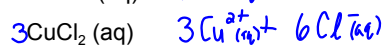
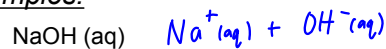
Ionization

-- when ionic compounds break apart into their ions

-- ions do this when they are in solution (in water)

-- (aq) means that the compound will break into its ions

examples:



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Writing Net Ionic Equations

Step #1: Complete and balance the chemical equation (molecular equation).



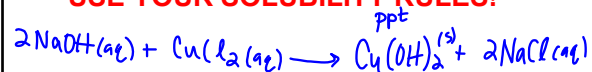
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Writing Net Ionic Equations

Step #2: Determine the states of matter.



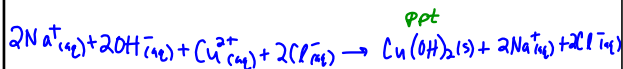
USE YOUR SOLUBILITY RULES!



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Writing Net Ionic Equations

Step #3: Write the complete ionic equation by determining what dissociates and what doesn't.

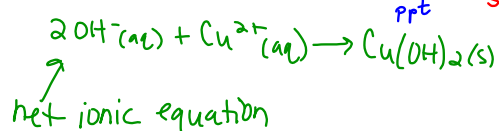


↑
complete ionic equation

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Writing Net Ionic Equations

Step #4: Cancel out the spectator ions (the ones that are the same on both sides).

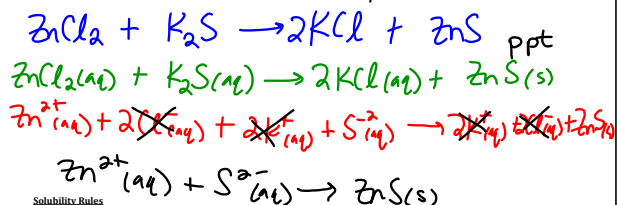


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spectator ions

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Practice

Write the molecular, complete ionic and net ionic equations for the reaction of zinc chloride and potassium sulfide.



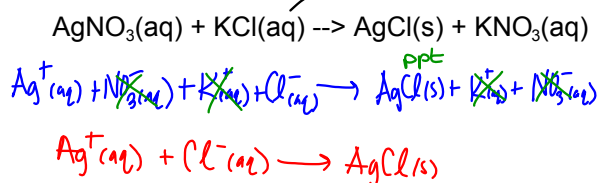
Solubility Rules

- NO₃⁻ All nitrates are soluble
- Cl⁻ All chlorides are soluble except AgCl, Hg₂Cl₂, PbCl₂
- SO₄²⁻ Most sulfates are soluble; exceptions include SrSO₄, BaSO₄, and PbSO₄. CaSO₄ is slightly soluble
- CO₃²⁻ All carbonates are insoluble except those in group 1 elements and NH₄⁺
- OH⁻ All hydroxides are insoluble except those of group 1 elements, Sr(OH)₂, and Ba(OH)₂; Ca(OH)₂ is slightly soluble
- S²⁻ All sulfides except those of group 1 and 2 elements and NH₄⁺ are insoluble

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Practice

molecular equation



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