

Write *balanced net ionic equations* describing the predominant reaction(s) that occur when the substances below are mixed in aqueous solution. None involves oxidation-reduction.

Zinc hydroxide reacts with excess acetic acid

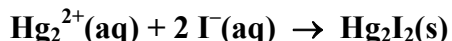


Hydroxide salts are mostly insoluble, and acetic acid is weak: thus no free ions as reactants.

Hydroxide salts always dissolve in acid.

[Comments in italics not part of the answer.]

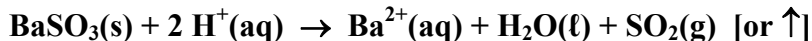
Potassium iodide solution is mixed with Mercury (I) nitrate solution



Potassium salts are soluble; nitrate salts are soluble, so reactants are all ions.

Most halide salts are soluble, but Mercury (I) is one of the metal cations that forms insoluble halides. Mercury (I) is the unusual metal cation that always appears as a dimer.

Solid barium sulfite is mixed with aqueous nitric acid



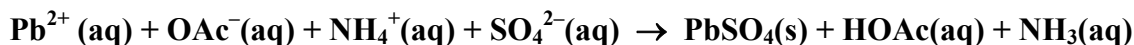
Reactants: Sulfites are generally insoluble and nitric acid is strong.

Sulfites in acid always form the weak acid H_2SO_3 that immediately falls apart to H_2O and SO_2

This is why sulfite ion, like carbonate ion, gives a positive test for ET-2

This equation is one you would write for ET-7.

Solutions of lead acetate and ammonium sulfate are mixed.

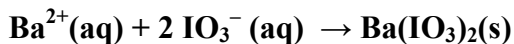


Since acetates and ammonium salts are soluble, the reagents are all ions

Most sulfates are soluble, but PbSO_4 is an exception.

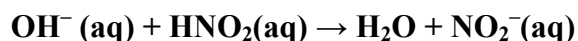
NH_4^+ is acidic, so it reacts with the base OAc^-

Barium nitrate solution is mixed with sodium iodate solution



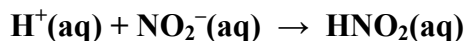
This reaction was studied in the common ion effect experiment.

Sodium hydroxide solution is mixed with nitrous acid



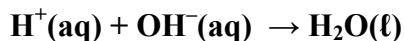
Sodium salts are soluble, nitrous acid is weak, hydroxide always reacts with any acid present

Hydrochloric acid is mixed with potassium nitrite solution



HCl is strong, potassium salts are soluble; nitrous acid is weak

Hydrochloric acid is mixed with potassium hydroxide



HCl is strong, potassium salts are soluble; H⁺ and OH⁻ will always combine to make water.

Silver acetate solution is mixed with hydrochloric acid



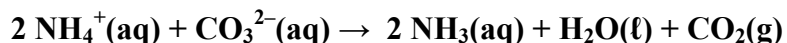
Acetate salts are soluble, HCl is strong; AgCl is insoluble, acetic acid is weak.

Sodium acetate solution is mixed with nitric acid



Sodium salts are soluble, nitric acid is strong; nitrate salts are soluble, acetic acid is weak.

Ammonium chloride solution is mixed with sodium carbonate solution



Ammonium and sodium salts are soluble; ammonium is an acid and carbonate is a base, so protons are transferred; the product H₂CO₃ is unstable.

Copper II hydroxide is mixed with acetic acid.



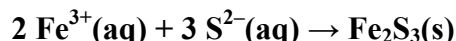
Hydroxide salts are generally insoluble, HOAc is weak; acetate salts are soluble.

Lead hydroxide is mixed with hydroiodic acid.



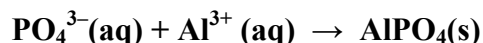
Hydroxides are generally insoluble, HI is strong; halides salts with Pb²⁺ are insoluble.

Solutions of iron (III) nitrate and sodium sulfide are mixed



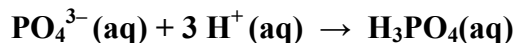
Nitrates are soluble, sodium salts are soluble; sulfides are generally insoluble.

Solutions of potassium phosphate and aluminum chlorate are mixed.



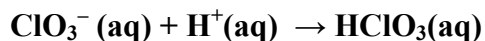
Potassium salts are soluble; chlorate salts are soluble; phosphates are generally insoluble.

A solution of potassium phosphate is mixed with excess nitric acid.



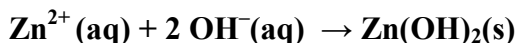
Potassium salts are soluble; nitric acid is strong; in excess acid, weak acids are fully protonated.

A solution of zinc chlorate is mixed with perchloric acid.



Chlorates are soluble, perchloric acid (HClO₄) is strong; chloric acid (HClO₃) is weak; perchlorates are soluble

Solutions of zinc chlorate and sodium hydroxide are mixed.



Chlorates are soluble, sodium salts are soluble; hydroxides are generally insoluble.