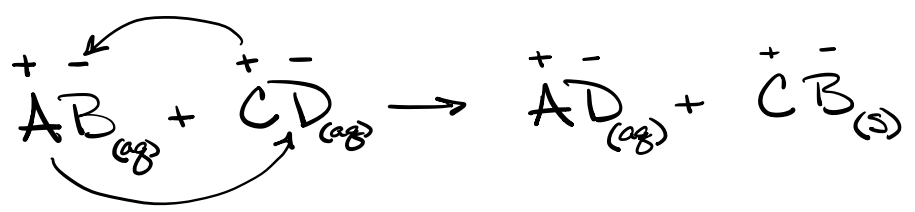


Today: Double Displacement

Different Names: Double Replacement
Precipitation Reactions

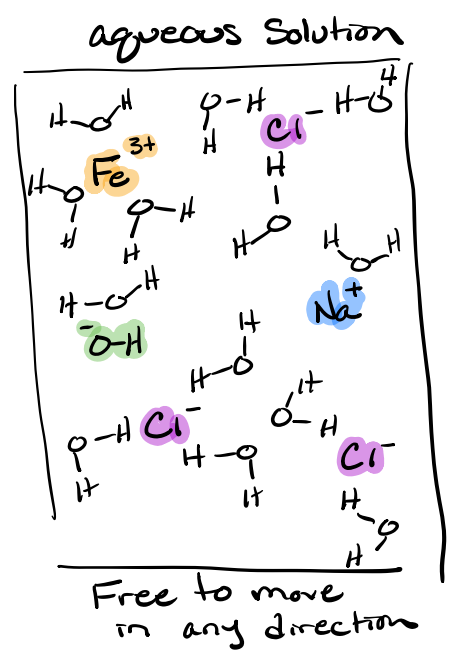
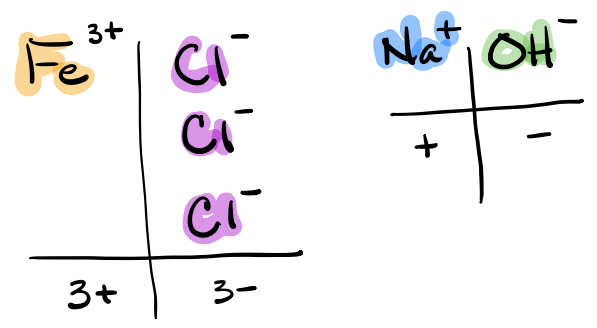
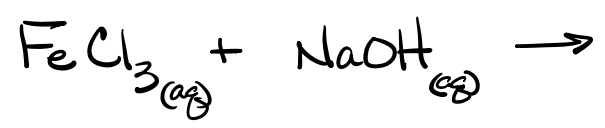


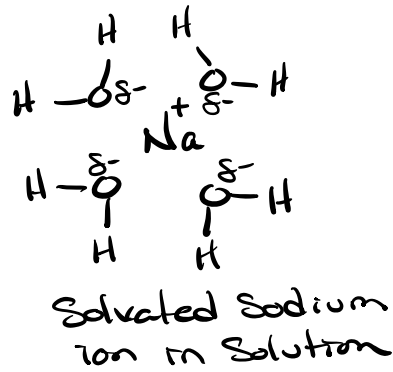
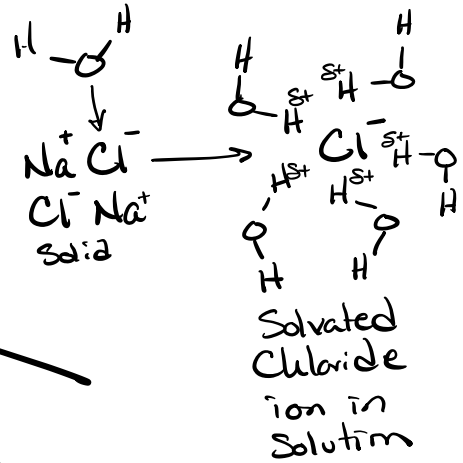
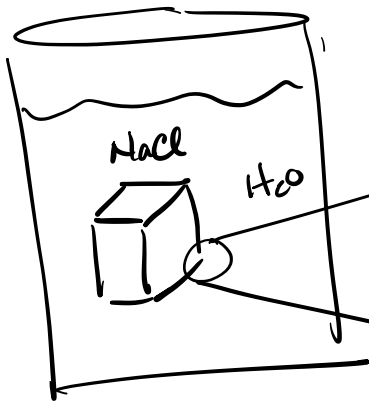
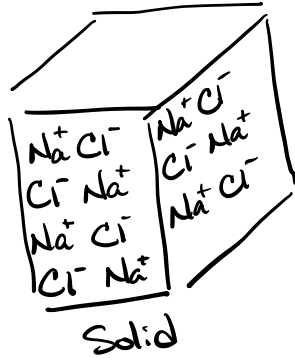
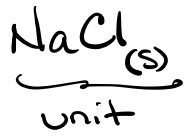
Cation first Anion Second

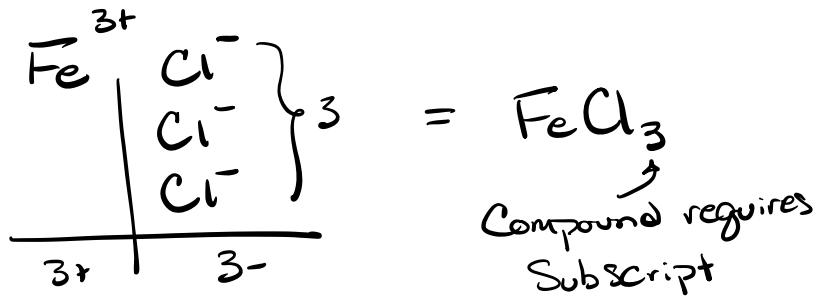
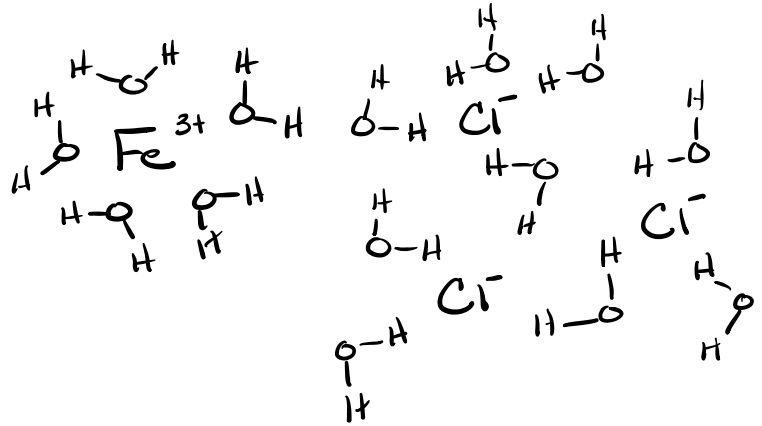
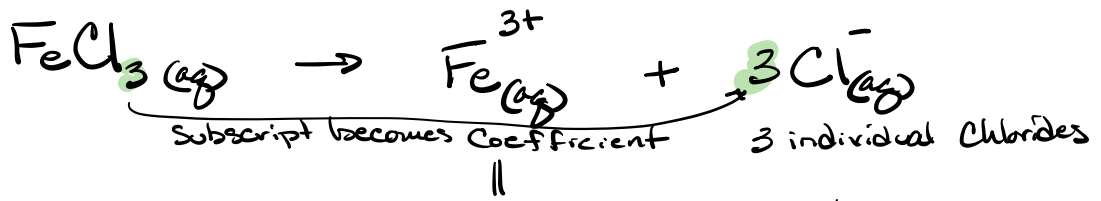
(aq) = aqueous solution
⇒ dissolved in H₂O

(s) = Solid

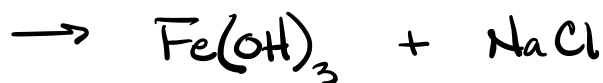
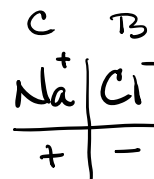
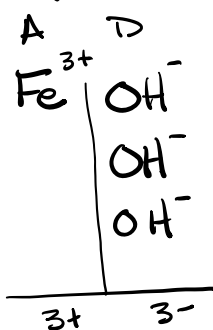
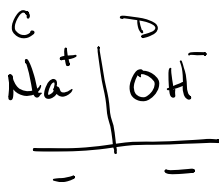
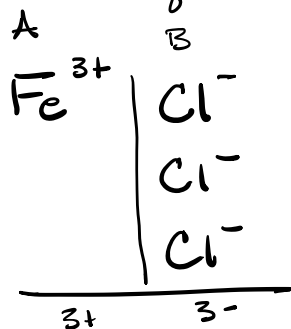
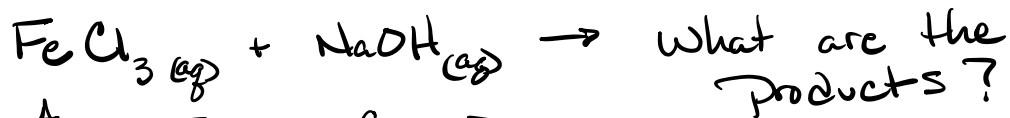
Ex



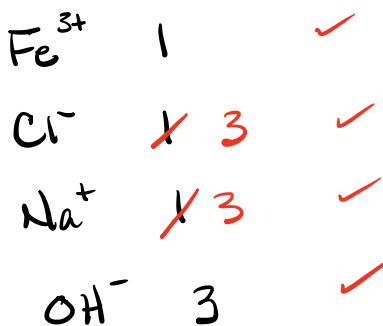
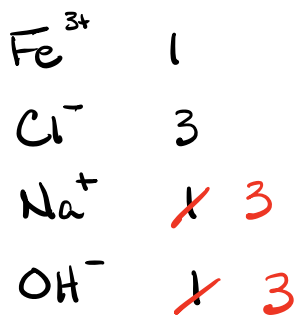




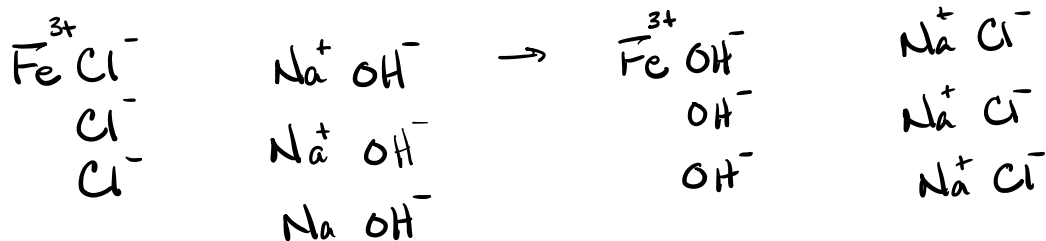
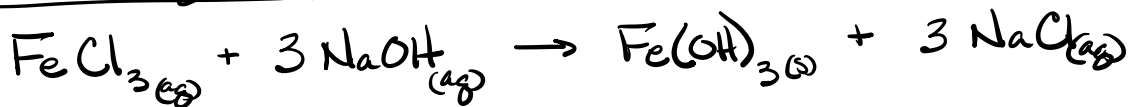
Ex



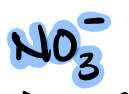
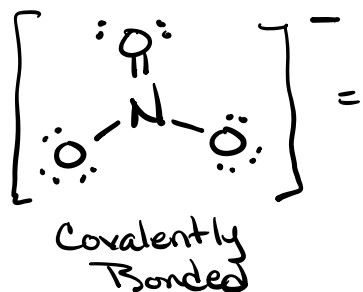
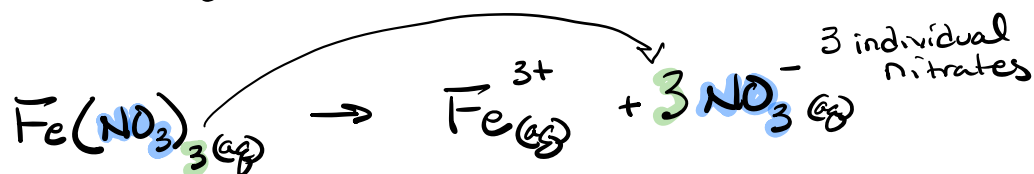
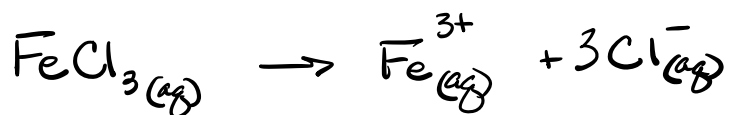
Initially out of Balance \Rightarrow Balance it



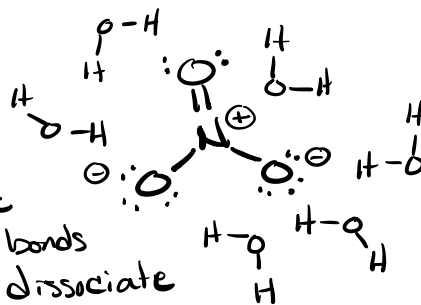
Chemical Equation - Balanced Eq w/ Cation & Anions grouped



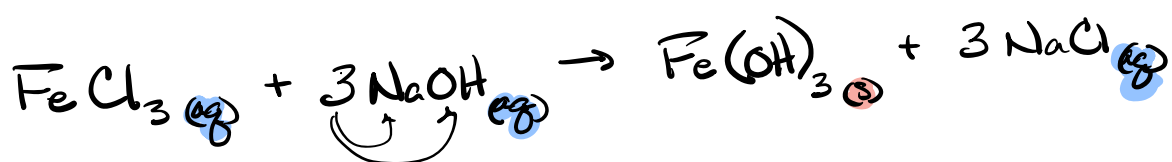
Ionic Equation → Shows individual ions dissociated



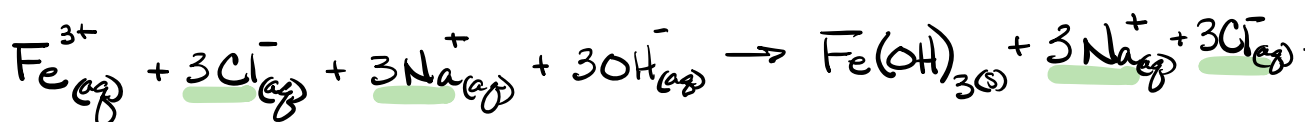
Polyatomic
Covalent bonds
do not dissociate



Chemical Equation

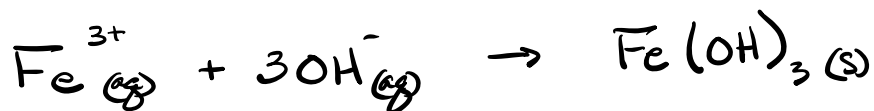


Ionic Equation



Spectator Ions

Net Ionic Equation \Rightarrow Equation without Spectators

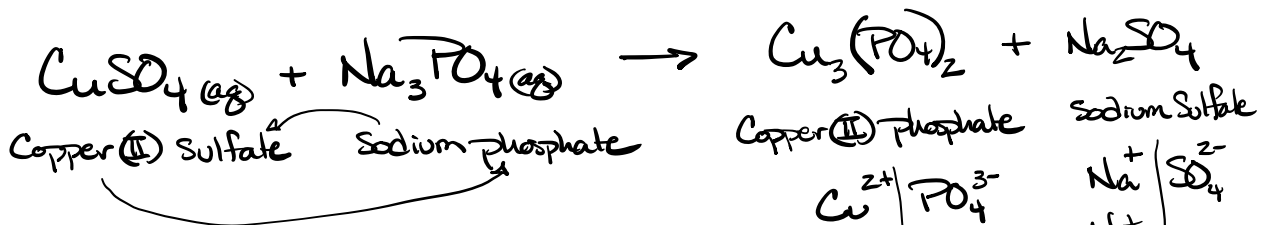


Chemical Equation \rightarrow Shows overall reaction.
Everything that is being added & produced

Ionic equation \rightarrow How the reaction looks in solution. It shows the individual dissociated ions.

Net Ionic equation \rightarrow Shows only what is changing. Drops out spectator ions.

Ex Write the products & the 3 different Eq.



ways to get the products correct

- Name reactants ✓
- Form products by name ✓
- Balance the formulas of the products (Subscripts) ✓
- Balance the equation with Coefficients

Cu ²⁺	PO ₄ ³⁻	Na ⁺	SO ₄ ²⁻
Cu ²⁺	PO ₄ ³⁻	Na ⁺	
6+	6-		2-

Balanced Chemical Equation

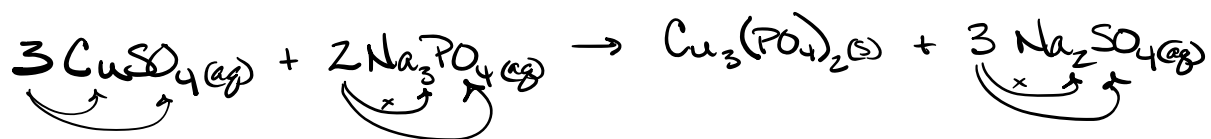
↓
Ionic
↓
Net Ionic



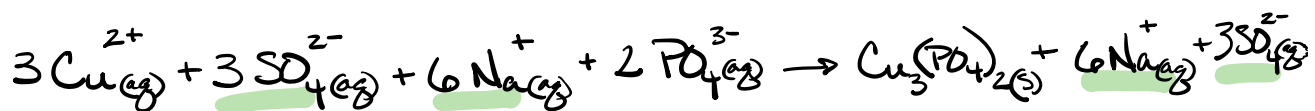
Cu ²⁺	x 3
SO ₄ ²⁻	x 3
Na ⁺	x 6
PO ₄ ³⁻	x 2

3	✓
x 3	✓
x 6	✓
2	✓

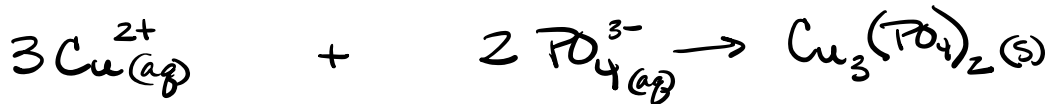
Chemical Equation

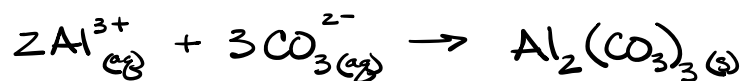
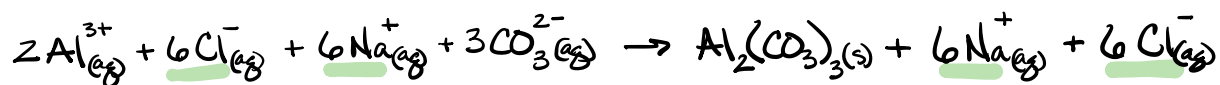
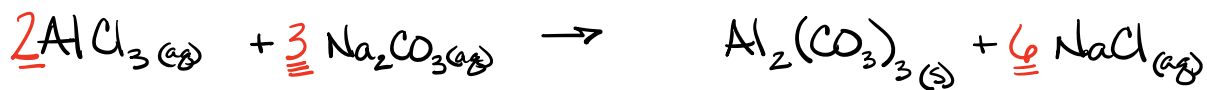
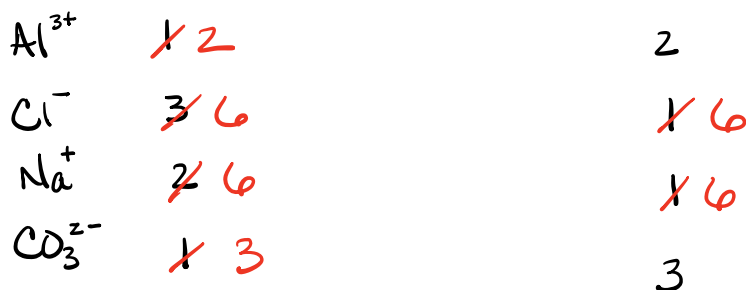
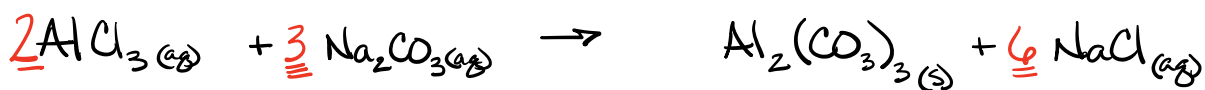
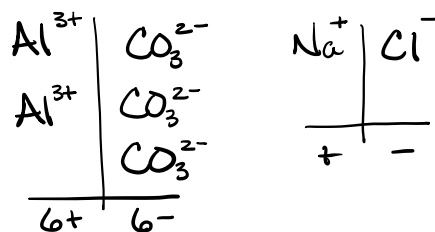
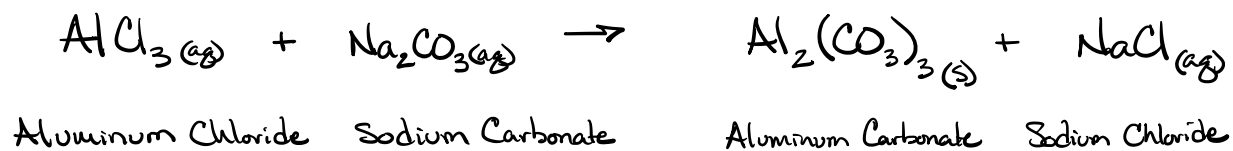


Ionic Equation



Net Ionic Equation

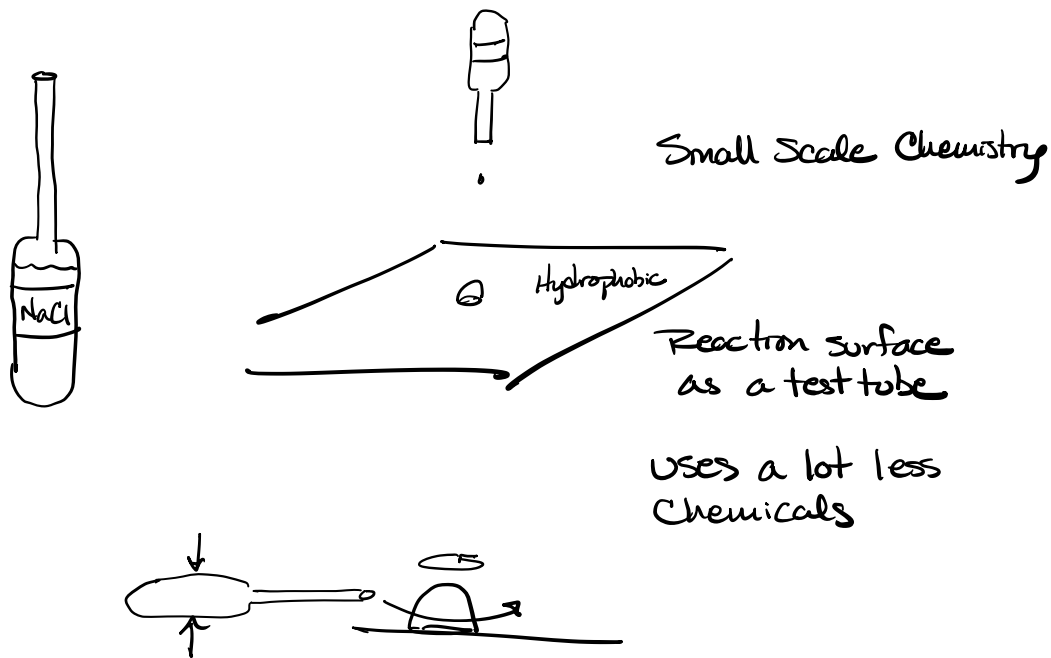




Solubility Experiment

Purpose To Conduct double displacement reactions to discern the Solubility rules for ionic Compounds.
⇒ practice writing double displacement equations.

Procedure : Place drops of reactants onto a reaction surface and make initial observations. Combine one drop of each pair of chemicals, mix, and make final observation.



Looking for Precipitates.

* Precipitate is a solid resulting from mixing two aqueous solutions.

Solids can be :

Hard
Crystalline
free flowing } Salt sitting at the
bottom of a glass of
water.

gel
milky
→ Cloudy
← Turbid
Opaque (opposite of clear)

aqueous solutions w/o solids

Clear ← you can see through them

















































Colorless

or

Colored blue, yellow, red

Actual Experiment Photo

blow air past the droplet to complete the mixing.

Sol'ns	CO_3^{2-} Na_2CO_3	Cl^- NaCl	OH^- NaOH	NO_3^- NaNO_3	PO_4^{3-} Na_3PO_4	SO_4^{2-} Na_2SO_4
Al^{3+} AlCl_3	 PPT		 PPT		 PPT	
NH_4^+ NH_4Cl						
Ca^{2+} CaCl_2	 PPT		 PPT		 PPT	 Small PPT
Cu^{2+} CuSO_4	 PPT		 PPT		 PPT	
Fe^{3+} FeCl_3	 PPT		 PPT		 PPT	
Pb^{2+} $\text{Pb}(\text{NO}_3)_2$	 PPT	 PPT	 PPT		 PPT	 PPT
K^+ KI						
Ag^+ AgNO_3	 PPT	 PPT	 PPT		 PPT	

Cations \downarrow \rightarrow all anions
 CO_3^{2-} Cl^- OH^- NO_3^- PO_4^{3-} SO_4^{2-}
 Na_2CO_3 NaCl NaOH NaNO_3 Na_3PO_4 Na_2SO_4

Al^{3+} AlCl_3	PPT		PPT		PPT	
NH_4^+ NH_4Cl						
Ca^{2+} CaCl_2	PPT		PPT		PPT	PPT
Cu^{2+} CuSO_4	PPT		PPT		PPT	
Fe^{3+} FeCl_3	PPT		PPT		PPT	
Pb^{2+} $\text{Pb}(\text{NO}_3)_2$	PPT	PPT	PPT		PPT	PPT
K^+ KI						
Ag^+ AgNO_3	PPT	PPT	PPT		PPT	

PPT = Precipitate = Solid Formation

No notation = No reaction observed