Common rules for solubility of salts

Ions	Solubility of salts	Solubility Exceptions
sodium (Na), potassium (K) and ammonium (NH ₄ ⁺)	all soluble	none
nitrates (NO ₃ -)	all soluble	none
chlorides (Cl-) and iodides (I-)	most soluble	silver (Ag ⁺), lead (Pb ²⁺), mercury (Hg ₂ ²⁺)
sulfates (SO ₄ ²⁻)	most soluble	Ag ⁺ , Pb ²⁺ , calcium Ca ²⁺ , strontium (Sr ²⁺) and barium (Ba ²⁺)
carbonates (CO ₃ ² -)	most insoluble	Group 1A, NH ₄ ⁺ soluble
hydroxide (OH-)	most insoluble	Group 1A, NH ₄ ⁺ soluble

Practice:

$$2 \text{ KI}(aq) + \text{Pb}(\text{NO}_3)_2(aq) \rightarrow 2 \text{ KNO}_3(aq) + \text{PbI}_2(s)$$

$$\triangleright b^{2q} + 2 \downarrow^{-} \rightarrow \text{PbI}_2$$

$$K_2SO_4(aq) + BaBr_2(aq) \rightarrow BaSO_4(s) + 2 KBr(aq)$$

 $Ba^{44} + SO4^{27} \rightarrow BaSO_4$

$$Na_2CO_3(aq) + Pb(NO_3)_2(aq) \rightarrow 2 NaNO_3(aq) + PbCO_3(s)$$

 $O_2^{L_-} + Pb^{2q} \rightarrow Pb CO_2$

$$Na_2CO_3(aq) + CoCl_2(aq) \rightarrow CoCO_3(s) + 2 NaCl(aq)$$

$$COS^2 + Co^{2+} \rightarrow CoCO_3$$

$$HCl(aq) + NH_4OH(aq) \rightarrow NH_4Cl(aq) + H_2O(l)$$

 $H^+ + OH^- \rightarrow H_2O$

$$2 \text{ NaC}_2\text{H}_3\text{O}_2(aq) + \text{Pb}(\text{NO}_3)_2(aq) \rightarrow 2 \text{ NaNO}_3(aq) + \text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2(aq)$$

$$\text{Long-Equation}$$

3 NaOH(
$$aq$$
) + FeBr₃(aq) \rightarrow Fe(OH)₃(s) + 3 NaBr(aq)

3 NaOH(aq) + Fe²⁺ \rightarrow Fe(OH)₃

Write down the ionic equations of the following reactions:

1. Zn with sulfuric acid

2. Copper (II) oxide with hydrochloric acid

3. Sodium with water

4. Sodium oxide with water

5. Calcium carbonate with sulfuric acid