

Answer Key

Soluble or Insoluble?

(Honors Chemistry)

Use the following table of solubility rules to determine whether or not a precipitate forms when the solutions listed below are mixed. Write a skeleton equation with the physical states and predict the products. If a precipitate forms, write it in the space provided. Write "NP" if no precipitate is formed during the reaction.

Soluble Compounds	Insoluble Exceptions
Group 1 metals and NH ₄ ⁺	
Nitrates (NO ₃ ⁻) and acetates (CH ₃ COO ⁻)	
Chlorides (Cl ⁻), bromides (Br ⁻) and iodides (I ⁻)	Ag ⁺ , Pb ²⁺ and Hg ⁺
Sulfates (SO ₄ ²⁻)	Ag ⁺ , Pb ²⁺ , Hg ⁺ , Ba ²⁺ , Sr ²⁺ and Ca ²⁺
Insoluble Compounds	Soluble Exceptions
Carbonates (CO ₃ ²⁻), sulfites (SO ₃ ²⁻) and phosphates (PO ₄ ³⁻)	Group 1 metals and NH ₄ ⁺
Hydroxides (OH ⁻)	Group 1 metals, NH ₄ ⁺ , Ca ²⁺ and Ba ²⁺
Sulfides (S ²⁻)	Group 1 and 2 metals and NH ₄ ⁺
Oxides (O ²⁻)	Group 1 metals, NH ₄ ⁺ , Ca ²⁺ and Ba ²⁺

	Chemical Equation	Precipitate or NP
1.	Potassium chloride (aq) + mercurous nitrate (aq) → $KCl(aq) + HgNO_3(aq) \rightarrow KNO_3(aq) + HgCl(s)$	HgCl
2.	Ammonium carbonate (aq) + potassium nitrate (aq) → $(NH_4)_2CO_3(aq) + 2KNO_3(aq) \rightarrow 2NH_4NO_3(aq) + K_2CO_3(aq)$	NP
3.	Sodium phosphate (aq) + stannous bromide (aq) → $2Na_3PO_4(aq) + 3SnBr_2(aq) \rightarrow 6NaBr(aq) + Sn_3(PO_4)_2(s)$	Sn₃(PO₄)₂
4.	Lithium nitrate (aq) + silver acetate (aq) → $LiNO_3(aq) + AgC_2H_3O_2(aq) \rightarrow LiC_2H_3O_2(aq) + AgNO_3(aq)$	NP
5.	Calcium iodide (aq) + ammonium phosphate (aq) → $3CaI_2(aq) + 2(NH_4)_3PO_4(aq) \rightarrow Ca_3(PO_4)_2(s) + 6NH_4I(aq)$	Ca₃(PO₄)₂
6.	Hydrosulfuric acid (aq) + plumbous nitrate (aq) → $H_2S(aq) + Pb(NO_3)_2(aq) \rightarrow 2HNO_3(aq) + PbS(s)$	PbS
7.	Rubidium nitrate (aq) + ferric chloride (aq) → $3RbNO_3(aq) + FeCl_3(aq) \rightarrow 3RbCl(aq) + Fe(NO_3)_3(aq)$	NP
8.	Sodium chloride (aq) + silver acetate (aq) → $NaCl(aq) + AgC_2H_3O_2(aq) \rightarrow NaC_2H_3O_2(aq) + AgCl(s)$	AgCl

Write the Complete Ionic Equation

(Honors Chemistry)

Predict the products and write a complete ionic equation for the following double replacement reactions. You must include the physical state!

1.	$K_3PO_4(aq) + CaBr_2(aq) \rightarrow$ $K^+(aq) + PO_4^{3-}(aq) + Ca^{2+}(aq) + Br^-(aq) \rightarrow K^+(aq) + Br^-(aq) + Ca_3(PO_4)_2(s)$
2.	$Rb_2O(aq) + Sr(NO_3)_2(aq) \rightarrow$ $Rb^+(aq) + O^{2-}(aq) + Sr^{2+}(aq) + NO_3^-(aq) \rightarrow Rb^+(aq) + NO_3^-(aq) + SrO(s)$
3.	$MgCl_2(aq) + NaOH(aq) \rightarrow$ $Mg^{2+}(aq) + Cl^-(aq) + Na^+(aq) + OH^-(aq) \rightarrow Na^+(aq) + Cl^-(aq) + Mg(OH)_2(s)$
4.	$Ba(NO_3)_2(aq) + Na_2SO_4(aq) \rightarrow$ $Ba^{2+}(aq) + NO_3^-(aq) + Na^+(aq) + SO_4^{2-}(aq) \rightarrow Na^+(aq) + NO_3^-(aq) + BaSO_4(s)$
5.	$Pb(C_2H_3O_2)_2(aq) + AlCl_3(aq) \rightarrow$ $Pb^{2+}(aq) + C_2H_3O_2^-(aq) + Al^{3+}(aq) + Cl^-(aq) \rightarrow Al^{3+}(aq) + C_2H_3O_2^-(aq) + PbCl_2(s)$
6.	$NH_4OH(aq) + ZnI_2(aq) \rightarrow$ $NH_4^+(aq) + OH^-(aq) + Zn^{2+}(aq) + I^-(aq) \rightarrow NH_4^+(aq) + I^-(aq) + Zn(OH)_2(s)$
7.	$K_2CO_3(aq) + Ca(OH)_2(aq) \rightarrow$ $K^+(aq) + CO_3^{2-}(aq) + Ca^{2+}(aq) + OH^-(aq) \rightarrow K^+(aq) + OH^-(aq) + CaCO_3(s)$
8.	$BeS(aq) + CuNO_3(aq) \rightarrow$ $Be^{2+}(aq) + S^{2-}(aq) + Cu^+(aq) + NO_3^-(aq) \rightarrow Be^{2+}(aq) + NO_3^-(aq) + Cu_2S(s)$