

Friday quiz 1 Precipitates, overall and ionic equations.

1) Give the name and formula of any precipitate formed when the following solutions are mixed. Write the balanced overall and ionic equations of any chemical reaction that may take place. Give states.

a. Silver nitrate and sodium carbonate

Name of precipitate *Silver carbonate*

Formula Ag_2CO_3

Overall equation $2AgNO_3(aq) + Na_2CO_3(aq) \rightarrow Ag_2CO_3(s) + 2NaNO_3(aq)$

Ionic equation $2Ag^+(aq) + CO_3^{2-}(aq) \rightarrow Ag_2CO_3(s)$

b. Ammonium nitrate and potassium sulphide

Name of precipitate *No precipitate formed*

Formula _____

Overall equation _____

Ionic equation _____

c. Calcium nitrate and sodium carbonate

Name of precipitate *Calcium carbonate*

Formula $CaCO_3$

Overall equation $Ca(NO_3)_2(aq) + Na_2CO_3(aq) \rightarrow CaCO_3(s) + 2NaNO_3(aq)$

Ionic equation $Ca^{+2}(aq) + CO_3^{2-}(aq) \rightarrow CaCO_3(s)$

d. Barium nitrate and sodium sulfate

Name of precipitate *Barium sulfate*

Formula $BaSO_4$

Overall equation $Ba(NO_3)_2(aq) + Na_2SO_4(aq) \rightarrow BaSO_4(s) + 2NaNO_3(aq)$

Ionic equation $Ba^{+2}(aq) + SO_4^{2-}(aq) \rightarrow BaSO_4(s)$

e. Copper(II) nitrate and sodium phosphate

Name of precipitate *Copper(II) phosphate*

Formula $Cu_3(PO_4)_2$

Overall equation $3Cu(NO_3)_2(aq) + 2Na_3PO_4(aq) \rightarrow Cu_3(PO_4)_2(s) + 6NaNO_3(aq)$

Ionic equation $3Cu^{+2}(aq) + 2PO_4^{3-}(aq) \rightarrow Cu_3(PO_4)_2(s)$

f. Iron(III)nitrate and potassium phosphate

Name of precipitate *Iron(iii) phosphate*

Formula $FePO_4$

Overall equation $Fe(NO_3)_3(aq) + K_3PO_4(aq) \rightarrow FePO_4(s) + 3KNO_3(aq)$

Ionic equation $Fe^{+3}(aq) + PO_4^{3-}(aq) \rightarrow FePO_4(s)$

g. Copper(II) nitrate and potassium sulfide

Name of precipitate *Copper(II) sulfide*

Formula CuS

Overall equation $Cu(NO_3)_2(aq) + K_2S(aq) \rightarrow CuS(s) + 2KNO_3(aq)$

Ionic equation $Cu^{+2}(aq) + S^{2-}(aq) \rightarrow CuS(s)$

- 2) Name the spectator ions in the mixtures stated in question 1 above.
- nitrate (NO₃⁻) + sodium (Na⁺)*
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- 3) Write balanced ionic equations for the following unbalanced, overall reactions.
- HCl(aq) + Na₂CO₃ (aq) → NaCl(aq) + H₂O(l) + CO₂(g)
2H⁺(aq) + CO₃²⁻(aq) → H₂O(l) + CO₂(g)
 - HNO₃(aq) + NaOH(aq) → NaNO₃ (aq) + H₂O(l)
H⁺(aq) + OH⁻(aq) → H₂O(l)
 - HNO₃(aq) + Zn(s) → Zn(NO₃)₂(aq) + H₂(g)
2H⁺(aq) + Zn(s) → Zn²⁺(aq) + H₂(g)
 - NaOH(aq) + HCl(aq) → NaCl(aq) + H₂O(l)
OH⁻(aq) + H⁺(aq) → H₂O(l)
 - Ca(OH)₂(aq) + HCl(aq) → CaCl₂(aq) + H₂O(l)
OH⁻(aq) + H⁺(aq) → H₂O(l)

Valency of Some Simple and Polyatomic Ions

Valency	Simple (+ve) ions	Simple (-ve) ions	Polyatomic ions
1	Copper(I), Cu ⁺ Hydrogen, H ⁺ Potassium, K ⁺ Silver, Ag ⁺ Sodium, Na ⁺	Hydride, H ⁻ Chloride, Cl ⁻ Bromide, Br ⁻ Iodide, I ⁻	Ammonium, NH ₄ ⁺ Hydrogencarbonate, HCO ₃ ⁻ Hydroxide, OH ⁻ Nitrate, NO ₃ ⁻
2	Calcium, Ca ²⁺ Copper(II), Cu ²⁺ Iron(II), Fe ²⁺ Lead(II), Pb ²⁺ Magnesium, Mg ²⁺ Zinc, Zn ²⁺	Oxide, O ²⁻ Sulfide, S ²⁻	Carbonate, CO ₃ ²⁻ Sulfate, SO ₄ ²⁻
3	Aluminium, Al ³⁺ Iron(III), Fe ³⁺	Nitride, N ³⁻	Phosphate, PO ₄ ³⁻