

Chemistry 30

Unit 4: Solutions**Assignment 5 – Net Ionic Equations and Precipitation Reactions**

1. Use a Table of Solubilities to predict whether or not the following compounds are soluble in water.

Compound	Soluble (yes or no)
CaI_2	yes
MgSO_4	yes
AlPO_4	no
$\text{Pb}(\text{NO}_3)_2$	yes
Ag_2SO_4	no
$\text{Ca}(\text{OH})_2$	no

2. Write formulas for the following compounds, and using a Table of Solubilities predict whether or not the compound is soluble in water.

	Formula	Soluble (y/n)
a) potassium phosphate	K_3PO_4	yes
b) calcium carbonate	CaCO_3	no
c) copper(II) bromide	CuBr_2	yes
d) aluminum sulfide	Al_2S_3	no

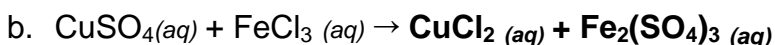
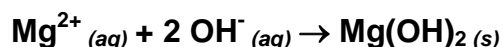
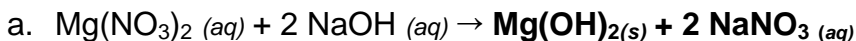
3. What are spectator ions?

Ions that are present during a reaction but undergo no chemical change

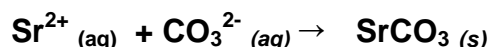
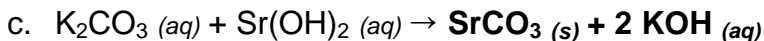
4. For each of the following reactions, predict the products of the reaction. Be sure to write **balanced equations**.

Then determine if any of the products forms a precipitate.

- If no precipitate forms, write **NR** (for “No Reaction”).
- If a precipitate forms, write the **net ionic equation** for the reaction.



No Reaction



5. An aqueous solution contains a mixture of Ba^{2+} , Pb^{2+} and Ca^{2+} . Select the ONE negative ion listed below which could be used to separate Ba^{2+} from the other two positive ions in the mixture.

A. Cl^- **Cl^- precipitates only with Pb^{2+}**

B. S^{2-} **S^{2-} precipitates only with Pb^{2+}**

C. OH^- **OH^- forms a precipitate with Pb^{2+} and Ca^{2+} but not with Ba^{2+}**

D. PO_4^{3-} **PO_4^{3-} precipitates with all three cations**

E. SO_4^{2-} **SO_4^{2-} precipitates with all three cations**

6. An aqueous solution containing the following cations:



In order to separate them, the following solutions are available:



If we wish to separate the cations by causing only one cation to precipitate out of solution as a time:

- in what order should the solutions Na_2S , Na_2CO_3 , and NaBr be added?
- identify the three precipitates that form after the addition of those solutions.
- which one cation will remain in solution?

	Ca^{2+}	Ag^+	Cu^{2+}	K^+
S^{2-}		ppt	ppt	
CO_3^{2-}	ppt	ppt	ppt	
Br^-		ppt		

ppt = forms a precipitate

1st add NaBr to form the precipitate AgBr . Ag^+ ions are now removed from the mixture

2nd add Na_2S to form the precipitate CuS . Cu^{2+} are now removed from the mixture

3rd add Na_2CO_3 to form the precipitate CaCO_3 . Ca^{2+} ions are now removed

The K^+ ions will now be the only cations present in the original solution.