

Colorful Precipitates

Purpose

To demonstrate the predictability of double replacement reactions, the use of solubility rules, and to provide an opportunity for students to write out formulas, total ionic and net ionic equations.

Materials

12 test tubes	Sodium carbonate
Test tube rack	Lead (II) nitrate
Nickel (II) chloride	Barium chloride
Potassium iodide	Copper (II) chloride
Sodium sulfate	Potassium chloride
Sodium nitrate	Silver nitrate
Ammonium thiocyanate	

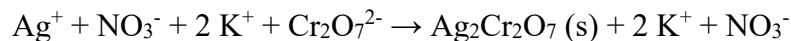
Procedure

1. Prepare 0.1 M solutions of each of the listed reagents.
2. Label 12 test tubes as follows:

1- AgNO ₃	5- Pb(NO ₃) ₂	9- BaCl ₂
2- K ₂ Cr ₂ O ₇	6- KI	10- Na ₂ SO ₄
3- NiCl ₂	7- NaNO ₃	11- CuCl ₂
4- Na ₂ CO ₃	8- KCl	12- Na ₂ CO ₃
3. Fill each test tube one third full of its solution
4. Pour the contents of test tube #1 into #2. Ask students to make observations, write out an ionic equation for the reaction, and name the precipitate.
5. Mix the remaining test tubes as follows, having the same patterns as in #4 above:
 - a. Test tube #3 into test tube #4
 - b. Test tube #5 into test tube #6
 - c. Test tube #7 into test tube #8
 - d. Test tube #9 into test tube #10
 - e. Test tube #11 into test tube #12

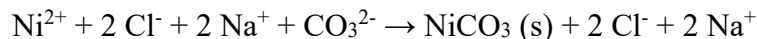
Additional Information

1. Silver nitrate and ammonium thiocyanate produce a brown precipitate, silver thiocyanate.

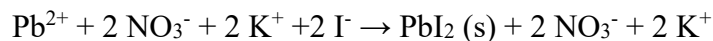


(all ions are aqueous) (spectator ions are ions that do not enter the rxn like K^+ and NO_3^-)

2. Nickel chloride and sodium carbonate produce the pale blue precipitate, nickel carbonate



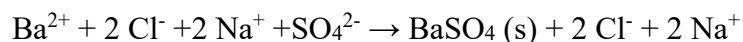
3. Lead nitrate and potassium iodide produce the yellow precipitate, lead iodide.



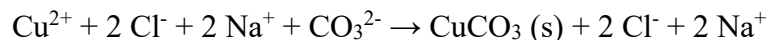
4. Sodium nitrate and potassium chloride produce no reaction.



5. Barium chloride and sodium sulfate produce the white precipitate, barium sulfate.



6. Copper (II) chloride and sodium carbonate produce the pale blue precipitate, copper (II) carbonate.



Questions for the Students

1. Identify the precipitate.
2. Write a balanced equation for the reaction.
3. Write the net ionic equation for the reaction.

Disposal

Solutions should be placed in appropriately labeled waste containers, taking care to get all of the precipitates into the waste container. Use UI# 205438.

Reference

Summerlin, L., Borgford, C., and Ealt, J. Chemical Demonstrations, Volume 2, 1987.