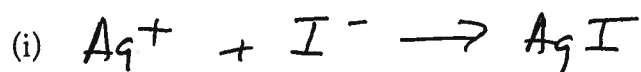


AP Chemistry  
Reaction Practice  
Day 10

Name Key 2011  
Date \_\_\_\_\_ Period \_\_\_\_\_

For each of the following three reactions, in part (i) write a BALANCED equation and in part (ii) answer the question about the reaction. In part (i), coefficients should be in terms of lowest whole numbers. Assume that solutions are aqueous unless otherwise indicated. Represent substances in solutions as ions if the substances are extensively ionized. Omit formulas for any ions or molecules that are unchanged by the reaction.

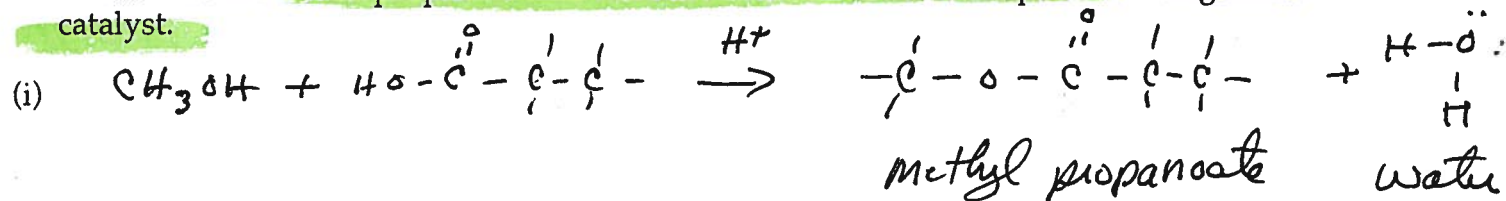
1. Solutions of silver nitrate and sodium iodide are mixed.



(ii) What is the color of the precipitate?

$AgI$  is a yellowish or pale yellow color

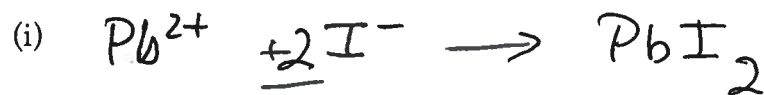
2. Methanol reacts with propanoic acid with the addition of a few drops of a strong acid as a catalyst.



(ii) Draw the structures of both products and provide their names.

See Above

3. Solutions of lead(II) nitrate and sodium iodide are mixed.



(ii) What are the colors of the products?

Bright yellow + sodium nitrate is colorless!

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**Question 5**

The identity of an unknown solid is to be determined. The compound is one of the seven salts in the following table.

$\text{Al}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$	$\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$	$\text{CaCO}_3$	$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
$\text{NaCl}$	$\text{BaSO}_4$	$\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$	

Use the results of the following observations or laboratory tests to explain how each compound in the table may be eliminated or confirmed. The tests are done in sequence from (a) through (e).

- (a) The unknown compound is white. In the table below, cross out the two compounds that can be eliminated using this observation. Be sure to cross out these same two compounds in the tables in parts (b), (c), and (d).

$\text{Al}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$	$\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$	$\text{CaCO}_3$	<del><math>\text{CuSO}_4 \cdot 5\text{H}_2\text{O}</math></del>
$\text{NaCl}$	$\text{BaSO}_4$	<del><math>\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}</math></del>	

One point is earned for each correctly crossed-out compound.

- (b) When the unknown compound is added to water, it dissolves readily. In the table below, cross out the two compounds that can be eliminated using this test. Be sure to cross out these same two compounds in the tables in parts (c) and (d).

$\text{Al}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$	$\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$	<del><math>\text{CaCO}_3</math></del>	<del><math>\text{CuSO}_4 \cdot 5\text{H}_2\text{O}</math></del>
$\text{NaCl}$	<del><math>\text{BaSO}_4</math></del>	<del><math>\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}</math></del>	

One point is earned for each additional correctly crossed-out compound.

- (c) When  $\text{AgNO}_3(aq)$  is added to an aqueous solution of the unknown compound, a white precipitate forms. In the table below, cross out each compound that can be eliminated using this test. Be sure to cross out the same compound(s) in the table in part (d).

<del><math>\text{Al}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}</math></del>	$\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$	<del><math>\text{CaCO}_3</math></del>	<del><math>\text{CuSO}_4 \cdot 5\text{H}_2\text{O}</math></del>
$\text{NaCl}$	<del><math>\text{BaSO}_4</math></del>	<del><math>\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}</math></del>	

One point is earned for crossing out  $\text{Al}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$  or for crossing out  $\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$  if it had not been crossed out earlier.

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**Question 5 (continued)**

- (d) When the unknown compound is carefully heated, it loses mass. In the table below, cross out each compound that can be eliminated using this test.

<del><math>\text{Al}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}</math></del>	$\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$	<del><math>\text{CaCO}_3</math></del>	<del><math>\text{CuSO}_4 \cdot 5\text{H}_2\text{O}</math></del>
<del><math>\text{NaCl}</math></del>	<del><math>\text{BaSO}_4</math></del>	<del><math>\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}</math></del>	

One point is earned for crossing out NaCl or for crossing out either  $\text{CaCO}_3$  or  $\text{BaSO}_4$  if they had not been crossed out earlier.

- (e) Describe a test that can be used to confirm the identity of the unknown compound identified in part (d). Limit your confirmation test to a reaction between an aqueous solution of the unknown compound and an aqueous solution of one of the other soluble salts listed in the tables above. Describe the expected results of the test; include the formula(s) of any product(s).

Mix an aqueous solution of  $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$  with an aqueous solution of  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ . The  $\text{BaSO}_4$  will precipitate.

One point is earned for describing a precipitation reaction between the compound left in part (d) and another compound given in the problem.

One point is earned for a correct identification of a precipitate that would form upon the mixing of the chosen solutions.