

## Experiment 5—Post-Lab Assignment

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1. Which cations ( $\text{Ba}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ) are present and absent in an unknown solution given the following observations?

- +
  - The unknown solution in test tube #1 plus  $(\text{NH}_4)_2\text{SO}_4$  gives a white precipitate.
  - The supernate in test tube #1 is poured into test tube #2.
  - The flame test of the white precipitate remaining in test tube #1 produces a green flame.
- +
  - The solution in test tube #2 plus  $(\text{NH}_4)_2\text{C}_2\text{O}_4$  gives a white precipitate.
  - The supernate in test tube #2 is poured into test tube #3.
- +
  - The flame test of the white precipitate remaining in test tube #2 produces a brick red flame.
  - The solution in test tube #3 plus  $\text{Na}_2\text{HPO}_4$  and  $\text{NaOH}$  gives no reaction.

Cation(s) present  $\text{Ba}^{2+}$ ,  $\text{Ca}^{2+}$  Cation(s) absent  $\text{Mg}^{2+}$

2. Which cations ( $\text{Ba}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ) are present and absent in an unknown solution given the following observations?

- - The unknown solution in test tube #1 plus  $(\text{NH}_4)_2\text{SO}_4$  gives no reaction.
  - The solution in test tube #1 is poured into test tube #2.
- x
  - The solution in test tube #2 plus  $(\text{NH}_4)_2\text{C}_2\text{O}_4$  gives a white precipitate.
  - The supernate in test tube #2 is poured into test tube #3.
- +
  - The flame test of the white precipitate remaining in test tube #2 produces a brick red flame.
  - The solution in test tube #3 plus  $\text{Na}_2\text{HPO}_4$  and  $\text{NaOH}$  gives a white precipitate.
  - The white precipitate in test tube #3 dissolves in  $\text{HCl}$ ; magnesium indicator and  $\text{NaOH}$  is added until the solution tests basic. A blue gel is observed at the bottom of the test tube after centrifuging.

Cation(s) present  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$  Cation(s) absent  $\text{Ba}^{2+}$

3. Write the names for the following ions using the Stock system. The first one has been done for you as an example.

a.  $\text{Cu}^+$  copper(I) ion

c.  $\text{Fe}^{2+}$  Iron(II) ion

e.  $\text{Sn}^{2+}$  Tin(II) ion

b.  $\text{Cu}^{2+}$  Copper(II) ion

d.  $\text{Fe}^{3+}$  Iron(III) ion

f.  $\text{Sn}^{4+}$  Tin(IV) ion



4. Complete the table below as shown by the example. Give the correct formula and name or the compounds using the ions.

	$\text{NO}_3^-$	$\text{SO}_4^{2-}$	$\text{PO}_4^{3-}$
$\text{Ba}^{2+}$	$\text{Ba}(\text{NO}_3)_2$ barium nitrate	$\text{BaSO}_4$ barium sulfate	$\text{Ba}_3(\text{PO}_4)_2$ barium phosphate
$\text{Ca}^{2+}$	$\text{Ca}(\text{NO}_3)_2$ Calcium nitrate	$\text{CaSO}_4$ calcium sulfate	$\text{Ca}_3(\text{PO}_4)_2$ Calcium phosphate
$\text{Mg}^{2+}$	$\text{Mg}(\text{NO}_3)_2$ magnesium nitrate	$\text{MgSO}_4$ magnesium sulfate	$\text{Mg}_3(\text{PO}_4)_2$ magnesium phosphate

5. Complete the table below as shown by the example. Give the correct formula and name or the compounds using the ions.

	$\text{NO}_2^-$ nitrite ion	$\text{SO}_3^{2-}$ sulfite ion	$\text{PO}_3^{3-}$ phosphite ion
mercury(II) ion $\text{Hg}^{2+}$	$\text{Hg}(\text{NO}_2)_2$ mercury(II) nitrite	$\text{Hg}_2^{2+} \times \text{SO}_3^{2-}$ $\text{Hg}_2(\text{SO}_3)_2$ mercury(II) sulfite	$\text{Hg}_2^{2+} \times \text{PO}_3^{3-}$ $\text{Hg}_3(\text{PO}_3)_2$ Mercury(II) phosphite
iron(III) ion $\text{Fe}^{3+}$	$\text{Fe}^{3+} \times \text{NO}_2^-$ $\text{Fe}(\text{NO}_2)_3$ Iron(III) nitrate	$\text{Fe}^{3+} \times \text{SO}_3^{2-}$ $\text{Fe}_2(\text{SO}_3)_3$ iron(III) sulfite	$\text{Fe}^{3+} \times \text{PO}_3^{3-}$ $\text{Fe}_3(\text{PO}_3)_3 \rightarrow \text{FePO}_3$ Iron(III) phosphite
lead(IV) ion $\text{Pb}^{4+}$	$\text{Pb}^{4+} \times \text{NO}_2^-$ $\text{Pb}(\text{NO}_2)_4$ lead(IV) nitrate.	$\text{Pb}^{4+} \times \text{SO}_3^{2-}$ $\text{Pb}_2(\text{SO}_3)_4 \rightarrow \text{Pb}(\text{SO}_3)_2$ lead(IV) nitrate	$\text{Pb}^{4+} \times \text{PO}_3^{3-}$ $\text{Pb}_3(\text{PO}_3)_4$ lead(IV) phosphite