***Practice Problems 08 – Selective Precipitation***

1. An aqueous solution containing the following cations:

Ca2+ Ag+ Cu2+ K+

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

Na2S Na2CO3 NaBr

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

a) in what order should the solutions Na2S, Na2CO3, and NaBr be added?

b) identify the three precipitates that form after the addition of those solutions.

c) which one cation will remain in solution?

2. We wish to separate the cations from a mixture containing the following solutions:

**Ra(NO3)2, Mg(NO3)2, and AgNO3**

In order to do so we are given the following separate solutions:

**K2SO4, K2S, and KOH**

In what order should we add the separate solutions in order to remove the cations by selective precipitation? List the precipitates that form, in the proper order.

3. You want to separate the followings cations from a solution: Be2+, Sr2+, and Ag+. If you are given NH4Br, Na2SO3, and H2SO4, list the order the substances must be added and the precipitates that form in each step.

4. An aqueous solution contains a mixture of Ba2+, Pb2+ and Ca2+. List 3 substances that can be added in the correct order such that 1 cation will precipitate out at a time. List the precipitate that forms in each step.

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Answer Key:

* 1. 1st 🡪 NaBr; 2nd 🡪 Na2S; 3rd 🡪 Na2CO3
  2. AgBr; CuS; CaCO3
  3. Potassium ion, K+

1. Order of adding: 1st 🡪 K2S; 2nd 🡪 K2SO4; 3rd 🡪 KOH

Precipitates: Ag2S, RaSO4, Mg(OH)2

1. Order of adding: 1st 🡪 NH4Br; 2nd 🡪 H2SO4; 3rd 🡪 Na2SO3

Precipitates: AgBr, Ag2SO4, BeSO3

1. Pb2+ can be successfully separated by various anions, but Ba2+ and Ca2+ cannot