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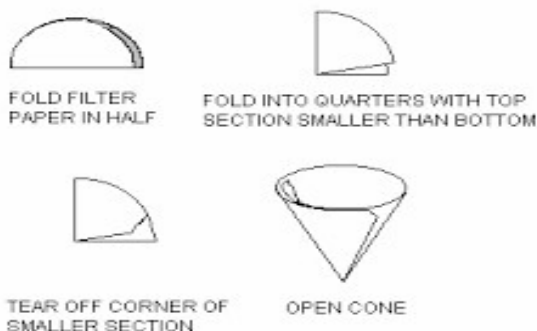
Name: _____

Chemistry 12 Qualitative Analysis

Qualitative analysis is the process by which components of a mixture are separated and identified. Unlike quantitative analysis, where the amount of a particular material is measured, a qualitative analysis scheme simply confirms the presence or absence of certain materials. A scheme must be developed to separate the ions from each other. In this lab, we develop a **qualitative analysis scheme** to separate and identify the components of a chemical mixture. The mixture may contain all or some of iron (III) ion (Fe^{3+}), the barium ion (Ba^{2+}), and the silver ion (Ag^+). We will confirm or deny the presence of an ion through precipitation. A **precipitate** (solid) of the aforementioned cations may form in the presence of a specific anion, while the remaining metal ions remain **dissolved** (in aqueous form). The precipitate may then be separated by gravity filtration, see below. The solid precipitate is then left to dry on the filter paper.

Gravity filtration

This method of filtration is used to remove an insoluble solid material from a solution. A filter paper is folded (see below) and placed in a filter funnel which is then placed in the neck of an Erlenmeyer flask or supported in a clamp or ring stand. The solution to be filtered is then slowly and carefully poured into the funnel taking care not to fill the funnel above the edge of the filter paper. Once the solution has been poured, let it rest for a few moments to ensure that all the solution passes through. Remove the filter paper and allow the precipitate to dry.



OBJECTIVES:

1. To confirm or deny the presence of Fe^{3+} , Ba^{2+} , and/or Ag^+ cations in a mystery solution using qualitative analysis.
2. To write out a detailed procedure for the precipitation and separation process of ions in a solution
3. To write out the formula, complete and **net ionic reaction** for each substance added to precipitate out the desired cation (assuming that it is present)

Procedure:

You will be given 10.0 mL of a mystery solution that is believed to contain Fe^{3+} , Ba^{2+} , and/or Ag^+ cations. You are to design a step by step procedure for the separation of these ions (should they all be present). Write the procedure in the form of a **flow chart**. You will be provided with stock solutions of 1.0M NaCl, 1.0 M NaBr, 1.0 M KI, 1.0 M K_2SO_4 , 1.0 M Na_2S , 1.0 M NaOH, 1.0 M Na_3PO_4 , 1.0 M Na_2CO_3 and 1.0 M Na_2SO_3 for this task. Before the flow chart you must include a precipitate table used to guide this process.

Data and Observations:

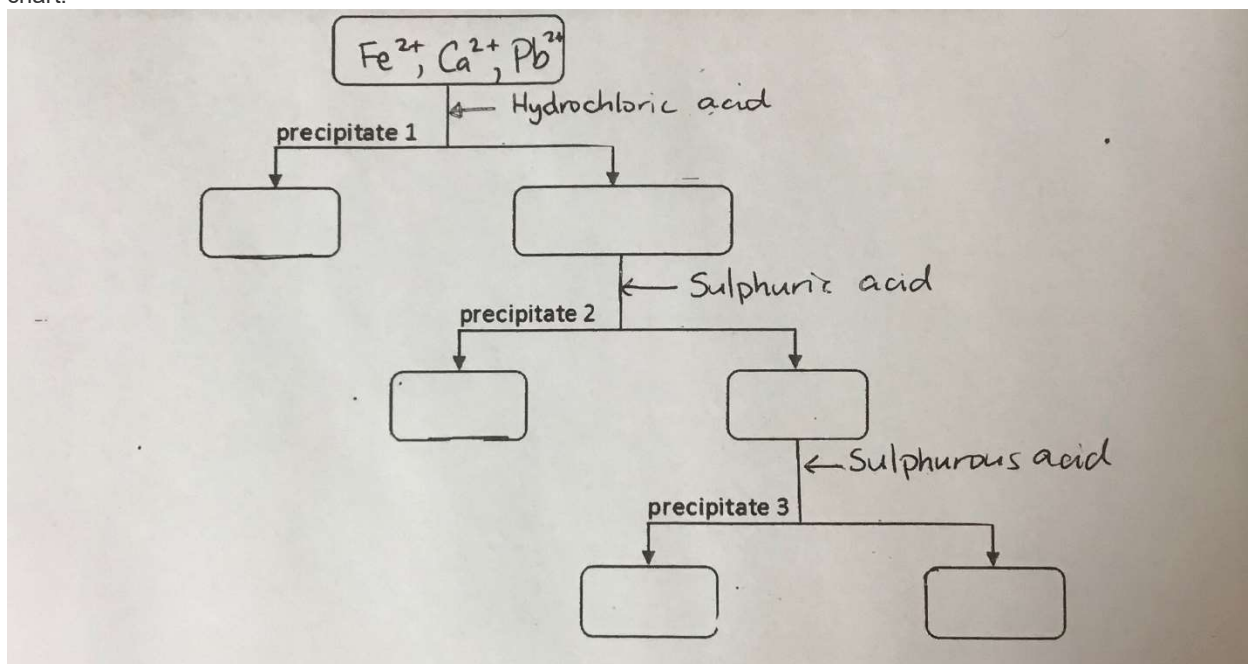
You are to design your own data and observations table to record the observations that you make (the table must include a spot for the letter of the mystery solution that you were given).

Analysis:

As this is a qualitative lab, there is no data to analyze

Discussion:

1. Write the formula, complete and **net ionic reactions** that occur when **hydrochloric acid** is added to an aqueous solution containing Fe^{2+} , Ca^{2+} , and Pb^{2+} ions. The ppt is then filtered out.
2. Write the formula, complete and **net ionic reaction** that would occur when **Sulphuric acid** is added to the remaining solution. The ppt is then filtered out.
3. Write the formula, complete and **net ionic reaction** that would occur when **Sulphurous acid** is then added to the remaining solution. The ppt is then filtered out.
4. Copy out and then fill in all the blanks with the appropriate compounds and/or ions in the following flow chart:



Sources of Error:

As this is a qualitative lab, there are no sources of error

Conclusion:

State your mystery solution and identify the ions which you determined to be present.

Be sure to include a connection with everyday life with a source!