

PRECIPITATION REACTIONS

Reminder – Goggles must be worn in the lab!

PRE-LAB DISCUSSION:

A PRECIPITATE is an insoluble substance formed by the reaction between chemicals in solution. Using simple methods of physical separation, it is possible to separate the insoluble precipitate from any remaining soluble substances. It is then possible to identify the components of the heterogeneous mixture using methods of qualitative analysis.

PROCEDURE:

1. Preparation of aqueous solutions
 - a. Obtain three test tubes from your lab drawer. Make sure that they are clean by rinsing them with distilled water and using a test tube brush.
 - b. Put several milliliters of distilled water in each test tube. You don't need to use a graduated cylinder – just fill each tube up to the length to the first knuckle on your baby (pinkie) finger.
 - c. To one test tube, add one spatula (micro-spoon) of barium chloride. Use a CLEAN glass stir rod to mix the solution until all the salt is dissolved.
 - d. To another test tube, add one spatula of potassium sulfate. Again, use a clean stir rod to mix the solution until all the salt is dissolved.
 - e. Using the third test tube, make a solution of sodium chloride, in the same way you prepared the first two solutions.
2. Testing the solutions
 - a. Take out a clean glass plate from your lab drawer.
 - b. Perform the following reactions by placing several drops of the solutions involved in proximity to one another on the glass plate, and then mixing them with the clean tip of a glass stir rod. Be sure to flush your dropper with distilled water between tests. Record the results of the tests in the **Evidence** section of your report.

Solutions	Observations
Sodium chloride (NaCl) + Potassium sulfate (K ₂ SO ₄)	
Sodium chloride (NaCl) + Barium chloride (BaCl ₂)	
Potassium sulfate (K ₂ SO ₄) + Barium chloride (BaCl ₂)	

3. Making a prediction
 - a. For the tests in which there was a precipitate, predict the identity of the product that precipitated. This becomes your "Claim" in the abstract.
4. Isolating precipitates –
 - a. We need larger samples of the precipitate to perform tests. Take the remaining solution and the test tubes that produced precipitates and combine them in a single tube. If you need to prepare more solutions, do so.
 - b. Once the precipitates are produced in sufficient quantities, we will separate the precipitate from the remaining solution by a process of centrifugations and washings.
 - i. Place a test tube containing a precipitate in the centrifuge. Be sure to place a test tube with an equal amount of solution directly opposite as a counterbalance. This can be a "blank" with water, another test tube with which you are working, or a tube from another group. Think about labeling the tubes so you know "which is which".
 - ii. Allow the centrifuge to spin for about 30 seconds. Keep your hands clear until the centrifuge comes to a complete stop.
 - iii. Take the test tube out, and CAREFULLY pour out the liquid layer on top. This is called "decanting".
 - iv. Add distilled water back on top of the precipitate, and repeat the centrifugation process. When done, again pour off the liquid layer on top, keeping the precipitate. This is called "washing" the precipitate. The purpose is to get rid of any unwanted soluble salts that might be trapped in the precipitate.
5. Testing the precipitate
 - a. Congratulations on making it to the final step. You now have a clean, isolated precipitate that contains a salt containing either barium, sodium or potassium. Fortunately, you know how to distinguish between these using a flame test.