Experiment One
Physical and Chemical Changes

Procedure

Part 1.

Using the labeled scoopula provided, place a small amount of iodine crystals (Figure 1) into a 250 mL beaker and cover the beaker immediately with your evaporating dish. YOU MUST DO THIS IMMEDTIATELY!!! IODINE GASES ARE HARMFUL IF INHALED OR COME IN CONTACT WITH SKIN!!! Place the covered beaker on the wire gauze supported by an iron ring on a stand. Place a little ice on the evaporating dish.

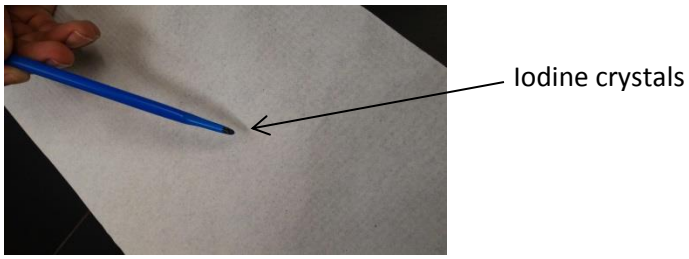

Figure 1. Amount of iodine crystals to be used.

Using a Bunsen burner apply gentle heat to the bottom of the beaker as in Figure 2. Observe what happens to the iodine crystals. What is happening? Continue heating gently until no iodine crystals remain on the bottom of the beaker. Describe what you see after all the crystals disappeared. Write down your observations.

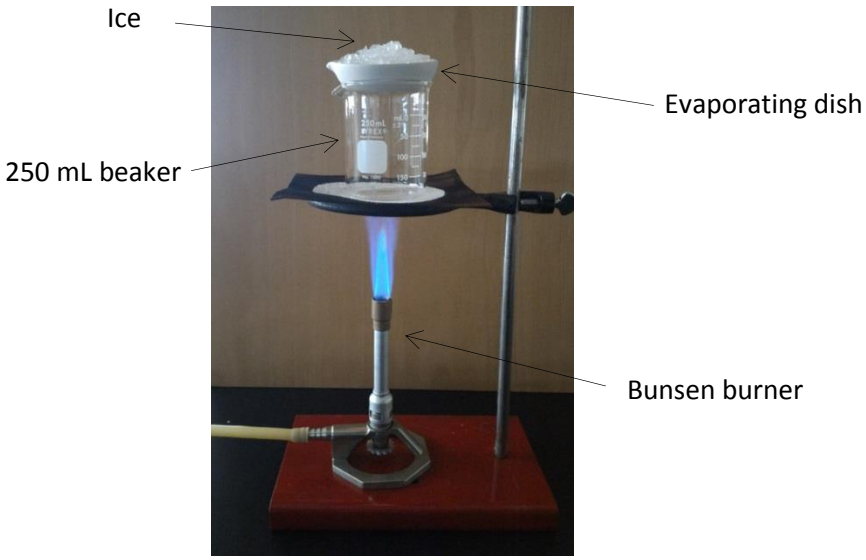

Figure 2. Part 1 Experimental Set up

You should be able to observe by now that after the crystals of iodine disappeared from the bottom of the beaker, a new group of crystals appeared on the bottom part of your evaporating dish. Do these crystals look different than the original ones? Scrape a few crystals of the bottom of your evaporating dish and place them in a test tube. Add 10 drops of methanol. DO THIS IN THE VENTILLATION HOOD!!! METHANOL IS A TERATOGEN AND MAY BE HARMFUL IF IT COMES IN CONTACT WITH YOUR SKIN!!! What happened to the crystals? Did they dissolve? Did the methanol change color? Write down your observations. In another test tube, place about the same amount of the iodine that you used at the start of this experiment. Add 10 drops of methanol. DO THIS IN THE VENTILLATION HOOD!!! Write down your observations and compare them with the observations of what happened to the crystals you scraped off the evaporating dish. Record your conclusions. Dispose of your chemicals in the appropriate waste container once you have finished with your experimental procedure.

Part 2.

Take a piece of magnesium ribbon from the provided container using the labeled tweezers provided. Take it back to your bench. Observe its physical properties. What is it color? Does it have luster? Is it flexible or not? Hold one end of the magnesium ribbon using tongs. Ignite the other end using a Bunsen burner. DO NOT LOOK AT THE MAGNESIUM WHILE IT BURNS!!! What does the burnt magnesium look like? What is it color? Does it still have luster? Is it still flexible? Is it possible to reignite it? Write down your observations. The ignited magnesium may be thrown in the trash bin.

Part 3.

Take some copper turnings and make two marble sized balls out of them with the palms of your hands. The size should allow them to easily fit into your test tube (Figure 3)

Figure 3. A couple of marble sized copper balls

Take one of the balls using tongs and hold it to the outer cone of the Bunsen burner flame for 4 minutes. Let it cool for a minute or so. Does the “burnt copper” look like the original copper? Is it still flexible? Did it change color? What is its texture? Record your observations. Place the “burnt copper” ball into a test tube and the other intact ball into another test tube. In the ventilation hood add 5 mL of 6 M sulfuric acid (H_2SO_4) to each of the tubes. DO THIS IN THE VENTILLATION

HOOD!!! CONCENTRATED SULFURIC ACID CAUSES SEVERE SKIN BURNS AND EYE DAMAGE SO TAKE EXTRA CARE WHEN HANDLING THIS REAGENT!!! Carefully go back to your lab bench with the tubes in your rack and record the color of solutions in each tube. Let both tubes stand for 7 minutes. After this time has elapsed observe both tubes against a white piece of paper and record your observations. Did any of the solutions change color? Dispose of these chemicals once you have finished in the appropriate waste container.

Part 4.

Place a very small amount of copper (II) sulfate ($CuSO_4$) in a 50 mL beaker (similar to the amount used for the iodine experiment, Figure 1) and add 10 mL of distilled water. Swirl the beaker gently until all the sample dissolves. Add a similar amount of potassium phosphate (K_3PO_4) to another 50 mL beaker and add 10 mL of distilled water. Swirl the beaker until all the potassium phosphate dissolves. Once both salts are completely dissolved pour one solution into the other and swirl the mixture. What happened when you mixed the two solutions? Write down your observations.

By mixing the solutions of copper (II) sulfate and potassium phosphate that made you created a mixture of 2 components. The solid portion of that mixture is called the precipitate and the liquid part is known as filtrate. What do you think is the color of the precipitate? What is the color of the filtrate? Chemists use a technique called gravity filtration to separate mixtures that contain these 2 types of components. In this technique the mixture is placed on a filter paper and the filtrate easily goes through the piece of paper leaving the precipitate behind.

The first step in this technique is folding the filter paper. The more folds you make to a filter paper the better your filtration is because it acquires greater surface area. In our case we will fold the filter paper in fourths, the simplest way of folding a circle of filter paper (Figure 4).

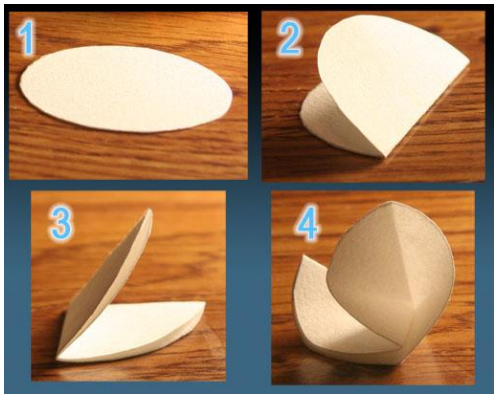

Figure 4. How to fold a filter paper circle in fourths.

Once you have folded your piece of filter paper, place it inside the funnel and add a couple of drops of distilled water on the paper so it stays in place. Your set up should look something like that in Figure 5. Slowly pour the mixture into the filter cone of your filtration apparatus. The filtrate will pass through the paper and deposit itself inside the beaker while the precipitate will stay on the

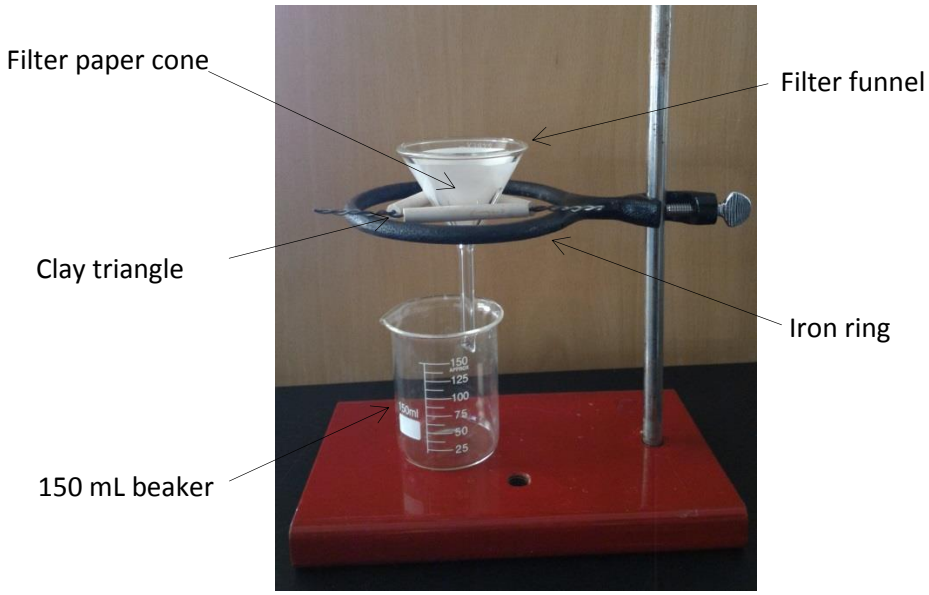

Figure 5. Filtration apparatus set up.

paper. Try to get as much of the precipitate onto the filter paper before you remove all of the liquid. You can accomplish this by periodically swirling your mixture and then pouring small aliquots of mixiture onto the filter cone. After you have poured all the mix and the filtrate has gon through, rinse your precipitate on the filter paper 2 times with 5 mL of distilled water. Let the mixture drain completely. Observe your precipitate and filtrate. What color are they? Is the color of your filtrate the same as the color of the liquid in the original mixture? Take a small sample of your precipitate and place it in a beaker. Add 20 mL of water and stir the mixture with your glass rod. Let the mixture set. Did the precipitate dissolve? Did the 2 original chemicals that you used mixed, copper (II) sulfate and potassium sulfate dissolved in water? What are the colors the you obeserved for both your solids and soltions? Write down your observations.