Chemistry – college flashcard

The purpose of this lab was to find the theoretical and experimental percentage yields of the double displacement reaction between the solutions Lead (II) Nitrate (PbNO3) and Potassium Iodide (KI). It is important to obtain amounts of Lead (II) Nitrate and Potassium Iodide as close to 1. 44g as possible. This reaction creates Lead (II) Iodide and Potassium Nitrate. The precipitate during this reaction is Lead (II) Iodide.

The balanced equation is Pb(NO3)2 + 2KI= PbI2 + 2KNO3. In this lab the Lead (II) Iodide is separated from the solution and collected so it can be weighed for a mass. Potassium Nitrate is separated from the water by boiling the solution, this is resulting in evaporation. This lab is using chemicals and the Bunsen burner so it is required to wear safety glasses throughout the lab.

Basic Calculations Molar Mass Pb(NO3)2= 331. 21 g/mol 2KI= 332 g/mol PbI2= 460. 99 g/mol 2KNO3= 202. 22 g/mol Materials * Approximately 1. 44g of PbNO3 * Approximately 1.

44g of KI * Bunsen Burner * Retort Stand * Ring Clamps * Sparker * Gas hose * Beaker x3 * Flask x2 * Funnel * Filter Papers * Water * Spatula * Safety glasses DiagramProcedure 1) Acquire necessary materials listed above. 1. 44g of PbNO3 and 1. 44g of KI were acquired. 2) Assemble filtration system. The filter paper was to be folded and inserted into the funnel.

Seal the filter paper to the funnel by using water. The funnel was set into the flask. 3) The substances were dissolved in 25 ml of water in beakers. 4) The solutions were thoroughly mixed together and then poured through the funnel.

This separated the precipitate from the filter. 5) Separate the precipitate from the filter and place into beaker.) Ignite the Bunsen Burner 7) Add 50ml of water to the precipitate. Place upon the Bunsen burner and wait for it to boil. 8) Set up another filtration system. Pour the boiling solution through the filter.

The PbI2 can now pass through the filter paper because it is more soluble in its heated state. As the solution cools the crystals form in the purified state. 9) Repeat steps 5-8 to increase the yield. 10) Filter the purified solution.

11) Place the filter with the precipitate within the oven to dry. 12) Weigh the final product. 3) Evaporate the water from the original filtrated solution to find the second substance. 14) Weigh evaporated filtrate. 15) Record results. Observations Table #1 – Step 1 PbNO3| KI| Solid| Solid| White powder| White Powder| Soluble in room temperature| Soluble in room temperature| 1.

44g| 1. 44g| Table #2 – Step 5 PbI2| KNO3| Liquid| Solid| Yellow Substance| Whitish in colouration| Semi clear| Not soluble| Soluble| | Table #3 – Step 8 PbI2| Heated State| Liquid| Yellow in colour| Table #4 – Step 12 and 14 PbI2| KNO3| Solid| Solid| Shiny| Dull| Yellow in colour| White in colour| Results Table #5 – Masses of Substances PbNO3| 1. 44g| KI| 1. 44g| PbI2| 0. 16g| KNO3| 0. 68g| Table #6 – Theoretical Yield PbI2| 1.

99g| KNO3| 0. 879g| Table #7 – Percent Yield of PbI2 0. 16g/1. 99gX100%| 8.

04%| Table #8 – Percent Yield of 2KNO 0. 68g/0. 879gX100%| 77. 4%| Discussion A double displacement reaction occurred during this lab between

Lead (II) Nitrate and Potassium Iodide. This forms two new substances, Lead (II) Iodide and Potassium Nitrate. The precipitate was PbI2.

PbI2 is a yellow substance that is insoluble. In the lab the precipitate was boiled and the substance became soluble. This was caused by heat, it can increase the solubility of substances because when you boil the substance it can be formed into a liquid which makes it soluble. The percent yield of 2KNO was much higher than the percent yield of PbI2.

The percent yield of PbI2 was 8. 04% while the percent yield of 2KNO was 77. 4%. The percent yield of Potassium Nitrate (2KNO) was considerably higher than the percent yield of Lead (II) Iodide (PbI2).

This will be explained further in the error analysis section. During this lab the substances go through a process of separating, collecting and purifying. During that process the substances go from solids to a liquid then back to a solid. This is because the PbI2 has to become heated so it can be soluble enough to pass through the funnel. That was the separating process where the crystals are going to be separated from the solution.

This cycle is repeated several times to get the best yield percentage possible. The crystals collected on the filter paper had to be placed into the drying oven so it can be turned back into a solid and able to be weighed for mass. That made this experiment very tricky and difficult because the goal was to get the best yield percentage possible. The KNO3 was separated from the water so it also could be weighed for mass; this was the easiest one to do because all that needed to be done was boil the solution until all the water has evaporated.

Error There are several possible errors that could occur during this lab. The main reason that could cause the accuracy of the results is transfer loss. Every time the substance changed containers, a small amount of the product was lost. The percent yield is calculated assuming that 100 percent of the product is still there. This lab was performed carefully although small accidents happen like minor spills which all affect the results in the end. Another possible error could be human error, there could of been an error when a measurement was taken or read, and also in the calculations, this could result in throwing the results off drastically.

Conclusion After this lab it was found that the theoretical yield of PbI2 was 1. 99g and the theoretical yield of KNO3 was 0. 879g. The percentage yield of PbI2 was 8. 04% and the percentage yield of 2KNO3 was 77.

%. This lab had a few mistakes that threw off the final results but the procedure was done correctly and it still shows the knowledge of how to do the calculations and steps. Analysis Pb(NO3) + 2KI= PbI2 + 2KNO3 331. 21 g/mol 332 g/mol 460. 99 g/mol 202.

22 g/mol Theoretical yield of PbI2 1. 44/331. 21 g/mol = x/460. 99 663. 8256= 331.

21x PbI2= 2. 00g 1. 44/332= x/460. 99 663. 825= 332x PbI2= 1.

99g Theoretical Yield of KNO3 1. 44/331. 21= y/202. 22 292. 196= 331. 21y KNO3= 0.

879g 1. 44/332= y/202. 25 KNO3= 0. 88g Percent Yield of PbI2 0. 16/1.

99 x100% = 8. 04% Percent Yield of KNO3 0. 68/0. 879 x100% = 77. 4%