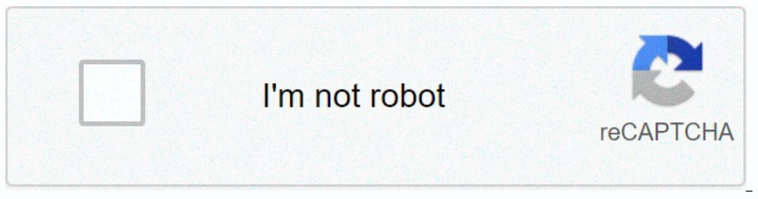

Continue

Lab report gravimetric analysis

Objectives Experimental analysis of unknown sulphate salts with precipitation reaction using techniques related to gravimetric analysis, for the collection and weighing of precipitation, I for calculating the percentage by mass \(\ce{SO_4^{{-2}}}\) u unknown sulphate salts via stoihiommetric analysis of sabrane precipitation, but then benefit from the taj percent for the identification of metal M uphable sulphate salts present. Gravimetric analysis is a quantitative method for accurately determining the amount of substance by selective precipitation of substances from an aqueous solution. Separate the precipitation from the remaining cash solution by filtration and then weigh it. Assuming that the chemical formula for precipitation is known and that the precipitation reaction continues until its conclusion, then the mass of the substance in the original sample can be determined. In this experiment, the percentage by weight of sulphate in an unknown sulphate salt will be determined by gravimetric analysis. First, a pre-weighted sample of unknown salt sulphate is dissolved in water. Then, excess barium chloride is added to the tube solution of the unknown salt. This will cause precipitation of all sulphate ions such as barium sulphate: \[\text{Metal sulphate (aq) + barium chloride (aq)} \ce{->} \text{Barium sulphate (s) + Metal chloride (aq)}\] Precipitate barium sulphate is collected by filtration, Dried i vagano. Since barium chloride is added to the surplus, and as the precipitation reaction continues to completion, it can be assumed that all sulphate is transferred from the original unknown sample to the precipitate. The mass of sulphate in the collected \(\ce{BaSO4}\) precipitation can be calculated through its percentage composition. This also gives the mass of sulphate in the original unknown, because: \[\text{mass of sulphate in precipitation = mass of sulphate in an unknown sample}\] Finally, using the mass of sulphate together with the initial mass of unknown used, the percentage by mass of sulphate in the original sample can now be calculated. To get the best results, the collected crystals \(\ce{BaSO4}\) must be as large as possible. This significantly helps the filtration process (larger crystals are less likely to be flown through filter paper), and also reduce the amount of impurities adsorbed to crystals (smaller surface area). In general, larger crystals are obtained when the precipitation rate is as low as possible. The precipitation rate is reduced by slowly adding the solution \(\ce{BaCl2}\) to the kesha mixture containing the unknown salt while constantly mixing the mixture. The precipitation rate may be further reduced by a slight increase in solubility \(\ce{BaSO4}\). This can be achieved by lowering the pH by 6 M \(\ce{HCl}\) and by increasing The result of a decrease in return \(\ce{BaSO4}\) is irrelevant. Chemicals Unknown solid sulphate salt, 6 M \(\ce{HCl}\) solution and 0.1 M \(\ce{BaCl2}\) solution Equipment 250 mL beaker, analytical balance, blender, 100-mL graduate cylinder, Stand with ring clamp, wire screen, Bunsen burner, wash bottle with distilled water, crucible and podd, crucible tongs, ash-less filter paper, large funnel, 500-mL Erlenmeyer flask, clay Safety triangle Be very with care handling 6 M \(\ce{Cl}\) (aq). If this acid comes into contact with skin or eyes, the affected area should be rinsed immediately with water for several minutes. Also remember that the items incinerated in the Bunsen burner are very hot (especially the crucible), and that allow enough time to cool before touching. Weigh a clean, 250-ml 250 ml beaker to the nearest 0,001 g using an analytical balance and record this weight on your laboratory report. Then add 0,30 – 0,35 grams of unknown sample to the beaker. Record the total weight of the biker and sample on the laboratory report. Add 50 ml of distilled water to the sample in the container, then 20 drops 6 M \(\ce{HCl}\) (aq). Stir the contents of the container until the sample has dissolved. Leave the stirrer in the bowl. At the back of the lab you get a stand with a ring clamp. Place wires on the wire screen and on the wire container containing your dissolved pattern. Use the Bunsen burner to heat the solution until it is almost (but not quite) boiling. Switch off the Bunsen burner before boiling. Measure 25 ml of 0.1 M \(\ce{BaCl2}\) (aq) with a 100 ml graduate cylinder during the heating of the solution. The graduate cylinder used must be clean (rinse with distilled water), but it does not need to be dry. Slowly add small parts \(\ce{BaCl2}\) (aq) to the beaker containing the hot solution. You must observe the formation of white precipitation \(\ce{BaSO4}\) (s). While adding the \(\ce{BaCl2}\) solution, stir in the contents of the container. Adding \(\ce{BaCl2}\) must be done very slowly – this step must take at least 3 minutes to complete! When finished, rinse all precipitation remaining on the blender in a solution with a small amount of distilled water, then allow the precipitation to occur in the biter for about 20 minutes. While the rainfall settles down, prepare your crucible by heating it in the hottest part of the Bunsen flame burner for about 2 minutes (use crucible ngs, cradle crudling, as revealed by the instructor – never pick up the crucible by pinching the walls). Repeat with the lid. Place the hot crucible and lid on the metal base of the rack to cool. When cooled to room temperature they weigh the crucible without a lid using an analytical balance, and record this mass on your laboratory report. You don't have to Cover. With your instructor, you get a piece of filter paper that is less for the maniar and fold it into quarters. Open the folding paper in the cash and place it in your large funnels. Apply the filter paper with a small amount of distilled water so that it fits into the pouring. Sit the funnel in the mouth of a 500 ml Erlenmeyer flask, which will be used to collect the filtrate. After 20 minutes, slowly mlyu progress the mixture containing \(\ce{BaSO4}\) precipitate through your blender into the suitcase. Be careful that the level of liquid in the funnel is never more than three-quarters of the way to the top of the filter paper. When the transfer is complete, use a washing bottle (filled with distilled water) to wash the remaining precipitation from the ketchup and mixing rod into the flow. When all the liquid is free from the funnel, the gloves press very carefully on the top edges of the filter paper together and the filter paper is gently folded into a compact package that will fit into the mess. It is important not to use too much force to avoid tearing up filter paper. Place the folding filter paper in a softener. Take the rack and the bunsen burner. Place your clay triangle on the ring and crucible in a clay triangle to support. Gently heat the crucible without a lid to remove water. When the paper appears to be shurraught (after a few minutes), heat the crucible more vigorously so that the filter paper starts to fire (turning from white, into brown, black) – but not so strong that the filter paper bursts into flames. If the filter paper bursts into flames, cover it with a cross cover to put out the flame, then reduce the amount of heat and remove the lid. Continue to moderately heating the cover until the filter paper is heating up. When all the filter paper has turned black, greatly heat the crucible without a lid in the hottest part of the Bunsen flame burner so that the bottom of the crucible is red hot. The center of the fire should be directly on the back of the fire. Carbon filter paper (carbon) is gradually started and converted into gas \(\ce{CO2}\). When the filter paper is fully burned, only white should remain in the softener \(\ce{BaSO4}\). Continue to heat the crucible vigorously until the filter paper remains on. This will take five to 10 minutes. Allow the crucible to cool to room temperature (this lasts at least 5 minutes). Weigh the crucible without the lid and its contents on an analytical balance. Record that mass. Place the Crucible and its contents back in a clay triangle and turn off the strong heat with the lid for another 5 minutes. Then allow to cool again and make up for the crucible and its contents without a lid. If the mass in the 12th and 12th hours of the year is Report. If the mass has decreased by more than 0,005 grams, then either \(\ce{BaSO4}\) is still weaty or the entire filter paper has not burned and this step must be repeated until you reach a consistent mass, making sure that the crucible is in the hottest part of the flame. Dispose of \(\ce{BaSO4}\) in the appropriate waste container, and then clean as instructed by the instructor. Let's say 0,323 g of unknown salt sulphate is dissolved in 50 ml of water. The solution is acidified with 6 M \(\ce{HCl}\), heat and slowly add the excess to the mixture, which results in white precipitation. Assuming that 0,433 g of precipitation is recovered, calculate the percentage by mass \(\ce{SO4^{2-}}\) in unknown salt. If it is assumed that the salt is alkaline sulphate to determine the identity of the alkaline cation. Experimental data Unknown Sulfate ID: Mass of empty 250 ml beaker mass 250 ml 250 ml beaker and unknown sulphate mass of unknown sulphate mass of 250 ml Empty crucible (without lid) Crucible mass (without lid) i barium sulphate Masaium sulphate Calculations I finish Calculate the mass of sulphate unknown uom sample. Show clearly every step of the calculation. Calculate the percentage by weight of sulphate in an unknown sample. Show me your work. Calculate the percentage by weight of the metal in an unknown sample. Show me your work. The citation in an unknown metal sulphate is one of the following: \(\ce{Al^{3+}}\) \(\ce{Na^+}\) \(\ce{Ni^{2+}}\) \(\ce{ce{K^+}\) \(\ce{NH^{4+}}\) \(\ce{Cd^{2+}}\) You use this information together with your experimental results to determine the citation. Unknown Sulfate ID: Ction Identity: Show all your work with clear, logical steps below. Clearly explain how the calculations here, together with your experimental results for #2 and/or #3, enabled you to identify the cation to the metallic sulphate. Questions We assume that unknown metal sulphate is 72.07% \(\ce{SO4^{2-}}\). Assuming that the charge is on metal cation +3, determine the identity of the cation. Unknown metal sulphates are hygroscopic and absorb water from the air. The unknown should therefore be stored in the ovens to remove any water absorbed. How would they affect the results if the unknown sample wasn't dried out? Would this error cause your calculation of the percentage by mass of sulphate in the unknown to be too high or too high? Commented. In this experiment, you used the excess solution \(\ce{BaCl2}\). How would you affect the results if you did not use the excess solution \(\ce{BaCl2}\) ? Would this error cause your calculation of the percentage by mass of sulphate in the unknown to be too high or too high? Commented. In the last step of the procedure, you have severely burned the precipitate \(\ce{BaSO4}\) wrapped in filter paper in the crucible. How they would affect your results if they were tiny parts filter paper still mixed with \(\ce{BaSO4}\) after heating? Would this error cause your calculation of the percentage by mass of sulphate in the unknown to be too high or too high? Commented. Commented.