Lab write up for separation by filtration and crystallization essay sample

Science, Chemistry

Experiment1

Separation of mixtures by filtration and crystallisation

Background

The separation of a mixture of two solids can often be achieved by filtration and crystallisation. To be successful, this requires that the components of the mixture have different solubilities in a particular solvent.

AimThe purpose of this experiment is to separate sodium chloride/charcoal and sodium chloride/copper(II) chloride mixtures.

Equipment requiredBalanceFilter funnel standFilter funnelBunsen, tripod and gauze matWatch glassGlass rodBeakers (two 100mL)Graduated cylinder (25 mL)Filter paper (Whatman No. 1—three 12. 5 cm sheets)Sodium chloride/charcoal mixture (4 g)Sodium chloride/copper(II) chloride mixture (8 g)Ethanol (25 mL)Distilled waterBoiling chipProcedureA Separation of a Sodium Chloride and Charcoal Mixture#1 Place 4 g of the salt/charcoal mixture in a 100 mL beaker and add about 15 mL of distilled water. Stir the mixture for about two minutes to allow the salt to dissolve.

#2 Set up a filter funnel with filter paper on a filter funnel stand. Filter the mixture and collect the filtrate in a 100 mL beaker as shown in Figure 1. 1.

#3 Wash the solid with a further 5 mL of water but do not add this to the filtrate.

Note and record the appearance of the solid#4 Add a boiling chip to the filtrate. Heatthe solution with a Bunsen burner andboil gently to reduce the volume.

#5 When crystals of sodium chloride appear, turn off the Bunsen and allowthe solution to cool.

#6 Record the appearance of the sodiumchloride crystals.

B Partial Separation of a Sodium Chloride and Copper (II) Chloride Mixture#1 Place 4 g of the sodium chloride/copper (II) chloride mixture in a 100 mL beaker and dissolve in about 15 mL of distilled water.

#2 Warm the solution with a Bunsen and boil gently until crystals begin to appear in the solution. Remove the Bunsen and cool the solution.

#3 Filter the solid formed and wash with about 5 mL of ethanol. Record the appearance of the solid and the filtrate.

Safety Note Ethanol is flammable. Make sure when using ethanol that there are no flames in the laboratory.

C Separation of a Sodium Chloride and Copperdi) Chloride Mixture#1 Place 4 g of the sodium chloride/copper(II) chloride mixture in a 100 mL beaker and add about 15 mL of ethanol.

#2 Stir the solution for about two minutes and filter off the undissolved solid. Wash this solid with about 5 mL of ethanol. Note the appearance of the solid.

#3 Place about 5 mL of the filtrate on a watch glass and allow the ethanol to evaporate. Record the appearance of the crystals which form.

Processing of results, and questions1What property enabled you to completely separate the sodium chloride/charcoalmixture? The solubilitys of the two substances in water allowed us to separate the mixture. Charcoal is insoluble in water while sodium chloride is soluble in water. This made it easy to filter out the charcoal and then crystallize the sodium chloride2In part B you were able to separate some pure sodium chloride but the filtratecontained both sodium chloride and copper(II) chloride. What can you say about thesolubilities of these two compounds in water? Both of these substances are soluble in water thus making it hard to separate completely.

3In part C you were able to completely separate the sodium chloride and copper(II)chloride using ethanol as a solvent. Explain why this was? possible using ethanol butnot when water was used as the solvent in part B? Yes it was possible for us to completely separate sodium chloride from copper because sodium chloride is soluble in ethanol and copper is not. This means copper is insoluble in ethanol allowing us to filter it out.