Producing aspirin by vacuum filtration essay sample

Health & Medicine

Aim: to be able to make aspirin

Equipment:

* Vacuum Filtration – Buchner funnel and flask

* Balance

* Air Condenser

* Conical Flask

* Beaker

* Measuring Cylinder

* Spatula

* Petri Dish

* Hot water bath – approx. 60oC

* Hydroxybenzoic Acid

* Ethanoic Anhydride

* Sulphuric Acid

* Distilled Water

Method:

* Collect all the equipment, using a measuring balance weigh out 5. 0g of 2-hydrobenzoic acid in a conical flask. Then add 7cm3 of ethanoic acid anhydride and also add three drops of concentrated sulphuric acid.

* At the top of the conical flask fit the air condenser and mix together the reagents and then add to a water bath with a temperature between 50- 60 °C for 15 minutes.

* After you have taken the conical flask out of the water bath then run it under cold water, remember not to remove the air condenser.

* Next add 75cm3 of distilled water, and then using a glass rod stir well.

* Then using a separating funnel adds filter paper to the top of the vacuum filter and then pours the solution into the Buchner funnel. Release the tap so water allows the filtration to process quickly. Then collect the solids which have been separated in the vacuum filtration

* Re-crystallise by transferring the crude product to 100cm3 flask and add in 15cm3 of ethanol, alongside 45cm3 of distilled water. Then fit the air condenser and place the conical flask into the water bath until the crude has dissolved

* Allow the solution to cool and then collect the product by vacuum filtration.

* Finally dry the product at room temperature.

Vacuum filtration:

Vacuum filtration is a technique used for separating a solid product from a solvent, or liquid reaction mixture, the mixture of solid and solvent is poured through a filter paper in a Buchner funnel, the solid is trapped in the filter paper and the liquid is poured through into a flask below by a vacuum. A filter is used to separate the solid from liquid by a vacuum pump to force the liquid through the filter. This is why vacuum filtration is used to obtain recrystallized solids such as aspirin. The liquid in the solution will pass through the filter paper quicker in order to achieve a dryer product in less time.

When recrystallizing the aspirin the impurities were kept in the solution, I used the process of vacuum filtration, this process got most of the water out which took out the impurities too. This process was really good to use, once all the impurities were took out the aspirin was ready to use for the next process.

Re-crystallisation:

Re-crystallisation is technique to dispatch a soluble. This technique relies on gentle evaporation of the solution over heat. The slower the evaporation, the bigger the crystals. This procedure of crystal formation helps to clean the substance. This is because the structure of crystal is reliant on on the form of the lattice pattern. Re-crystallisation depends on on alteration in solubility of substances so the impurities substances crystal out first so the rest can re-crystallise. Aspirin is less soluble then the impurity, so when adding cold water to it the saturated point reduces. As this reduces this shows that no more is able to dissolve allowing white solids to form. These solids form they

crystallise so more products comes out allowing more crystallisation to occur leaving behind the impurities.

Melting point results table:

Test tubes

Temperature Câ¦

1st try

132 Câ¦

2nd try

128 Câ¦

3rd try

130 Câ¦

Average of the temperature:

132 + 128 + 130 = 390 Câ¦

390Câ¦ = 130Câ¦

3

AVERAGE = 130 Câ¦

The melting point of pure aspirin:

The melting point of aspirin is between138-140 Câ¦, my results were lower than that, this is because in my aspirin they were impurities, these impurities will lowered the melting point of my aspirin therefore making my melting point of the aspirin that I made about 130Câ¦. another example is when in winter the, vehicles go around putting salt on the top of the snow, the salt decreases the melting point of the snow therefore making it easier for road users to drive. So having impurities will decrease the melting point but it increases the boiling point. One way to think of it is that impurities get in the way of the bonds that would be holding the solid together. By disrupting the normal organization of atoms or molecules in that solid, the impurities weaken the bonds holding the solid together (keep in mind these are bonds BETWEEN atoms and molecules, not within them).

As these intermolecular bonds weaken, it takes less energy to pull the molecules apart, which means it will melt to a liquid at a lower temperature.

Conclusion-

in my conclusion I saw that my aspirin had less impurities compared to the commercial aspirin, the commercial aspirin showed more dots, this is because the commercial aspirin had other ingredients added in, this will have an effect on the aspirin, it will make it more impure as for my aspirin it didn’t have other substances added in therefore it wasn’t impure as much as the commercial aspirin

Method:-

First I got a TLC plate and measured 1cm above the plate and drew a line, then I measured 4cm wide from the side. Measure 1cm from the side, take 2 test tubes and put in a 3rd of the aspirin with the spatula into the test tube, then a 3rd of the commercial aspirin into another test tube. Add 2. 5 ml of ethanol and 2. 5ml of dye chloromethane to another test tube and mix it together. Take a pipette and add 1cm of the solution to each test tube containing the aspirin, shake well do the aspirin dissolves, then get a capillary tube and put it on the TLC Plate and let it dry, you place the dots with the capillary tube four times and see the colour, then get a beaker and add ethanol acetate into the beaker and wait until the four dots go up on the TLC Plate and change colour and then make a mark.

Results:-

From my results I got two different results this is because, I used two different aspirins, a commercial aspirin which affected the results because in the commercial aspirin, chemicals where added and in the original aspirin I got normal results.

Evaluation:

While I was doing experiments in found it easy to work with a partner, the method was easy to set up, I found it difficult to understand the concept of some of the techniques used. Io found it easy to put the equipment away and use it, I had no problem. But because of the science laboratory, we didn’t have all of the resources that we needed so we didn’t make pure

aspirin, if I had to do the experiments again I would make sure that I have all the resources that I need to make pure aspirin.