Purity of aspirin report

Written report discussing the purity of my aspirin sample I produced. When I carried out the experiment to produce an aspirin sample I had to take a few results I had gained from carrying out the experiment later used these to work out the experimental error and percentage % yield. The results I used where the published value of what temperature pure aspirin melts at, the temperature my aspirin sample melted at, the weight of pure aspirin and the weight of impure aspirin. Firstly I worked out the experimental error by using this equation:

The reason I had 5. 83% of error in my experiment is due to some of the errors I could have made whilst conducting it such as measuring out too much or too little of the salicylic acid (tablets) I measured approximately 6g into 100ml conical flask, the experimental error could have been weighing out 6. 1g or less than 6g. Other ways in which I could have made experimental error are adding too much or too little ethanoic anhydride as well as the sulphuric acid that was also added to the mixture.

In part 2 of the experiment I had to measure out 15cm3 of ethanol, which I could have measured out incorrectly could have been one of the possibilities to cause an increased a experimental error, when I added the crude aspirin to the ethanol if I didn’t boil them at a constant temperature of 75oc, if I let them temperature rise or fall out of limits it could lead to a higher percentage of experimental error. Secondly I worked out my percentage yield: Weight of impure aspirin = 9. 8g Weight of pure aspirin = 4. 83g

The main reasons in which I could have produced a low percentage yield and experimental error are mainly due to the calibration of equipment and how

accurately they measure, if the equipment isn’t calibrated well then this will affect the accuracy of certain reading you take from it, if you calibrate it properly your results will be a lot more accurate. Some of the factors that affect the purity are any impurities that could be found in the glassware used and within chemicals or even water used, quantity of chemicals used, and sticking to temperature and time limits.

Method for the manufacture and purification of aspirin: Part 1 Salicylic acid (Aspirin tablets) 100 cm3 conical flask 10 cm3 measuring cylinder Ethanoic anhydride Concentrated sulphuric acid in a dropping bottle 400 cm3 beaker Tripod, gauze and Bunsen burner Thermometer 250 cm3 beaker Reduced pressure filtration apparatus Filter paper Glass stirring rod Deionised or distilled water in a wash bottle Spatula Part 2 25 cm3 measuring cylinder Boiling tube Ethanol Thermometer Deionised or distilled water in a wash bottle 250 cm3 beaker 100 cm3 conical flask Glass stirring rod

A kettle Part 1 method: Sddadas= possiblities that could affect the percentage yield 1. Weigh out 6. 00 g of salicylic acid (aspirin tablets) directly into a 100 cm3 conical flask. When mesuring out the salycylic acid you could either mesure out to little or too much 2. Record the mass of the tablets and how many you used. 3. Using a 10 cm3 measuring cylinder, add 10 cm3 of ethanoic anhydride to the Flask and swirl the contents. To decrease the chances of measuring to much use a pippette as it is more accuate with mesurments as the pipette is narrower. . Add 5 drops of concentrated sulphuric acid to the flask and swirl the mixture in the flask for a few minutes to ensure the mixture dissolves. You could mesure either to many or to little amounts of sulphiric acid which could affect the purity If you

didn’t mix the chemicals properly then the chemical wont react properly. 5. Warm the flask for twenty minutes in a 400 cm3 beaker place the flask in the beaker and ensure you constantly measure the temperature it’s should be keep at 60oc and not rise above 65oc at the highest.

Heated mixture at an incorrect temperature or time could also ruin the experiment as the chemicals could disintegrate. 6. Allow the flask to cool and pour its contents into 75 cm3 of deionised water in a beaker, stirring well to precipitate the solid. Not allowing the mixture to cool fully may destroy the aspirin as it shouldn’t be keep warm and the mixture needs to solidify. 7. Filter off the aspirin under reduced pressure using the reduced pressure filtration apparatus drawing out any excess liquid, avoiding skin contact.

Whilst filtering the aspirin the water used could contain impurities, which would also affect the purity, as impurities would go into the aspirin. When filtering using pressure there may not be enough pressure which means impurities may still remain. Even using wrong filter paper could affect purity. 8. Collect the crude aspirin and leave to dry till solidifies. General reasons that could affect purity – unclean equipment could be contaminated and not rinsing out remnants of chemicals and solids e. g. not rinsing conical flask after dissolving aspirin reduce the amount of yield gained. Part 2 method purification: 1.

Using a 25 cm3 measuring cylinder, measure out 15 cm3 of ethanol into a boiling tube Adding the wrong amount of ethanol would affect the purity 2. Prepare a beaker half-filled with hot water at a temperature of approximately 75 oC. The safest way to do this is to use a kettle of boiling water and add

water from the kettle to cold water in the beaker until the temperature is at approximately 75 oC N. B. The boiling point of ethanol is 78 oC and the temperature of the water in the beaker should not be allowed to go above this Heating the mixture above 78 oC will remove the ethanol before it gets to react with the aspirin. . Use a spatula to add the crude aspirin to the boiling tube and place the tube in the beaker of hot water. 4. Stir the contents of the boiling tube until all of the aspirin dissolves into the ethanol. 5. Pour the hot solution containing dissolved aspirin into approximately 40 cm3 of water in a 100 cm3 conical flask. If a solid separates at this stage, gently warm the contents of the flask in the water bath until solution is complete. You should avoid prolonged heating, since this will decompose the aspirin.

Heating the mixture for too long will decompose it decreasing yield. 6. Allow the conical flask to cool slowly and white needles of aspirin should separate. 7. If no crystals have formed after the solution has cooled to room temperature, you may need to use an ice bath and to scratch the insides of the flask with a glass stirring rod to obtain crystals. 8. Filter off the purified solid under reduced pressure and allow it to dry on filter paper. 9. Record the mass of the dry purified solid.