

Enthalpy of solution lab report assessed assignment



The procedure had a lot of weaknesses and limitations. To be able to see the limitations and weaknesses easier a list would be necessary. We used a Styrofoam cup with a hole in the lid. This has a lot of heat loss to the surroundings since heat is easily radiated to the surrounding air. So the temperature was probably greatly affected because of this. (very significant since A LOT heat is lost to the surroundings. We had to stir the salt in the water. This generates heat. This affects the results. (not very significant since it should not generate very much heat. The NaOH was in crystal form and not a fine salt. This leads to that it has less surface area and so the reaction goes slower. When the reaction goes slower it takes more time to carry out the experiment and more heat can radiate to the surrounding air and the solution has to be stirred for a longer time. (quite significant since the reaction time is important to minimize the heat loss to the surroundings) The specific heat capacity of the water might alter when the salt is added to it. Then the c -value in the formula will change (not very significant since it will only alter it very little).

When stirring the solution and trying to keep the lid on most people failed. The lid moved and at some points fell off. This led to an even greater heat loss to the surroundings. Trying to add the salt into the water while holding the thermometer and stirring at the same time was hard. This led to a lot of pauses and in some cases salt was dropped on the table as well affecting the results. Although there are some weaknesses and one is a very significant one, the experimental value compared to the literature value was not very different.

Also, the weaknesses might cancel out a little since stirring the solution generates heat and the poor apparatus makes the solution lose heat to the surrounding air. So the procedure could give a result with good quality, like in this case. And the weigh showed up to 3 decimal numbers, which lead to that the percentage uncertainty was almost negligible. So the apparatus were precise and accurate to some level. The thermometer on the other hand showed no decimal numbers (it was not a digital electronic one). This was the main reason to the very high random errors.

This also led to that the experiment results were not very precise since the random errors were 17.2%! This is not very accurate. But since the results were accurate there can not have been very many systematic errors or other errors since the experimental value agreed a lot with the literary value.

IMPROVEMENTS Since it had weaknesses which were mainly due to the poor apparatus, there is room for easy improvements in most cases. A list will be easier to read. If we had used a calorimeter the heat loss would not have been near the heat loss that was present in this experiment.

Taping the lid on top of the cup before stirring and then maybe even taping the thermometer (which we stirred the solution with) through the hole and cover the hole with tape would have helped a lot. One would still be able to stir the solution. If we had started with an initial temperature higher than 19 Celsius degrees the salt crystals would have dissolved by itself and generating heat by stirring would not have been a problem. But in that case a box that would have a entrapure the same as the solutions initial temperature would have been needed since otherwise a lot of heat from the hot water would have been lost to the surrounding.

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If the individuals that carried out the experiment had worked two and two the problem with doing many things at the same time would not have been a problem. The systematic error was not very high at all but could have been reduced if we had done many more trials. If we had been given more time then there would have been time for more trials and the mean value ought to have less systematic errors then. If we had been in a proper and better lab room then we would have had a rater access to precise and accurate apparatus which would have lead to less random errors.