Determining the percent copper and zinc in pennies essay sample

Environment, Water

Mass 10 pennies, record data. Fill a 100mL graduated cylinder to 40mL or enough to fully submerge the pennies with water, record the volume in data table. Carefully place the pennies into the graduated cylinder, record the final volume of the water in data table. To find the volume of the pennies, subtract the final volume from the initial, record the data. Repeat this procedure twice more. Use the density formula to calculate the density, and then calculate the accuracy and precision of your measurements. Mass 20 pennies, record data. Fill a 100mL graduated cylinder to 40mL or enough to fully submerge the pennies with water record the volume in data table. Carefully place the pennies into the graduated cylinder, record the final volume of the water in data table. To find the volume of the pennies, subtract the final volume from the initial, record the data.

Repeat this procedure twice more. Use the density formula to calculate the density, and then calculate the accuracy and precision of your measurements. Mass 30 pennies, record data. Fill a 100mL graduated cylinder to 40mL or enough to fully submerge the pennies with water record the volume in data table. Carefully place the pennies into the graduated cylinder, record the final volume of the water in data table. To find the volume of the pennies, subtract the final volume from the initial, record the data. Repeat this procedure twice more. Use the density formula to calculate the density, and then calculate the accuracy and precision of your measurements. For post-1982 pennies-

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Observations:

During the experiment we were giving the following percent compositions of both pre-1982 pennies and post-1982 pennies, from which we were instructed to calculate the accepted value for density with. Pre-1982 pennies: Cu- 95%, Zn- 5%; accepted density= 7. 1710g/cm3 Post-1982 pennies: Cu- 2. 5%, Zn- 97. 5%; accepted density= 8. 8431g/cm3 In order to do this, we had to determine the amount of Copper and Zinc in each proportion to measure each specific percent value, as shown in the "% Cu and %Zn According to Density" graph. This specific procedure involved massing estimate pieces of each metal, determining the displacement of each metal, determining the percent of Copper and Zinc in the mix of pieces, then finding the percent of each metal, and finally determining the density of each different percent mixture of Copper and Zinc.

Results:

The data that we calculated was precise, but not accurate, with the exception of a couple trials. The densities we calculated resulted in high absolute percent errors, meaning unacceptable values. Given that a few trials were relatively accurate, the final volume was what was different in the previous or post trials of the group of pennies. For example, most of the masses of the pennies remained relatively constant, but the displacement of the water we observed was off by 1. 0mL for two trials in two different groups, while the other four trials remained precise with each other. This resulted in a closer value for density with the accepted value, than the other trials that contained the same displacement that was not 1. 0mL off. I believe that misreading of the meniscus during the measurement of final volume was at fault for this inconsistency in data measurements. Otherwise, most of our data, like I said, was inaccurate, but precise.

Discussion/Data:

I believe that the execution of our experiment was consistent with our set procedure, however the validity of our collected data is not acceptable. Our calculated absolute percent error measurements were off the charts, which I believe occurred because of a misreading of our final volume in most of the trials. We did receive a couple of accepted density values in this experiment, in only the post-1982 pennies group, where we calculated densities of 8. 27g/cm3, and 8. 28g/cm3. Which are acceptably close to the actual density; 8. 84g/cm3. Our other measurements we collected, was unreasonable in comparison to the actual values.