Electrolysis Experiment to Calculate Avogadro's Number

Stanley, Law (School: Jackson Academy)

PURPOSE The project's purpose is to determine the number of particles in a mole, which is Avogadro's number. My hypothesis is that a mole of any substance contains a definite number of particles. Research question: Can Avogadro's number be determined by electrolysis? PROCEDURE I weighed 3 copper strips and recorded the findings. That night I set up the experiment. The pure copper (anode) gave up 2 electrons per atom. The electrons went through the wire to the battery, through the battery to the ammeter, and through the last wire to the silver coin (cathode). The sulfuric acid provided hydrogen ions, which needed electrons to form hydrogen gas. The hydrogen ions (H+) migrated quickly to the silver coin and used up the electrons there. The ammeter measured the electrons going through it in amps: a Coulomb per second. By measuring the seconds the experiment ran and estimating the average amps during this time, I calculated how many electrons ran through the ammeter. Remembering that 2 electrons were provided by each atom that changed, I divided the number of electrons by 2 to get the number of copper atoms that changed. But, I needed to calculate moles. I returned to Paragon for my second weighing 24 hours later and recorded the new masses for 3 trials. OBSERVATIONS/RESULTS Findings after converting loss of mass in Cu to moles, then calculating the atoms, then determining atoms/mole: Trial 1: 4.02% error Trial 2: 3.68% error Trial 3: 0.53 % error CONCLUSION Based on 3 trials, I can conclude, considering a small percentage of error (2.74%), that a mole of a substance does contain a definite number of particles, which is Avogadro's number.

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