

Electrical Properties of Carbon Nanofluids

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Electrically conductive inks have wide applications in wearable electronics, sensors, and inkjet printed circuits. The goal of this project was to make quantitative measurements on the electrical properties of aqueous suspensions of carbon nanomaterials. To create the electrically conductive ink, Sodium Dodecyl Sulfate (SDS) was used to stabilize the MWNTs in solution. Coats of ink were applied to standard printer paper to measure the sheet resistance of the ink using a Signatone S-302 4-point probe. The resistivity of the ink was determined with an apparatus that I designed and built, it used a series of inter-locking vinyl tubes and solid copper rods as the electrodes. An Agilent 3458A 8 1/2 Digital Multimeter was used to capture a resistance measurement which was then used along with the dimensions of the vinyl tubes to calculate the resistivity of the ink. By measuring the resistivity of a 5 wt% sample of saltwater and then comparing it to the values found in a table, it was concluded that the apparatus was accurate within a reasonable margin of error.