Experimental and computational study on the temperature behavior of CNT networks

Abstract:
We report on the electrical properties of carbon nanotubes networks deposited using spray deposition onto interdigitated gold structures. The properties have been measured experimentally and analyzed using a computational method. In particular, we studied the variation of resistance as a function of the temperature in networks having different nanotubes density. We found a good agreement between the simulation and the experimentally obtained results for the networks with higher densities. Our results suggest that the change in the temperature behavior is due to the desorption of oxygen molecules at relatively high temperature. This effect is found to be the function of the network density. To have a better insight on the conduction properties of the networks, we also model the voltage drop and the current flows across the networks and these results have been found in good agreement with experimental one reported in the literature.

Stichworte:
carbon nanotubes, desorption, electrical conductivity, oxygen, spraying, CNT networks, carbon nanotubes networks, conduction properties, current flows, electrical properties,
interdigitated gold structures, nanotubes density, network density, oxygen molecule desorption, spray deposition, temperature behavior, voltage drop, Computational modeling, Electrical resistance measurement, Films, Nanotubes, Resistance, Temperature, Temperature measurement, 3D Modeling, CNT Networks, Percolation Threshold, Spray-Deposition, Temperature

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