Thermal and Electrical Properties of SWNT Fibers

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We measured the electrical and thermal properties of single wall carbon nanotube (SWNT) fibers prepared using a recently-developed technique [B. Vigolo et al., Science Vol.290, 1331 2000). Nonmetallic behavior from 1.4 to 300 K has been observed from resistivity measurements. Heat treatment at 400 C results in a decrease of resistivity by as much as three orders of magnitude. Fruther studies on heat treatment will be reported. The room temperature thermal conductivity ranges from 15 to 70 W/m-K in different samples. These values lie between those of bulk unoriented mats (10 W/m-K)) and magnetically-aligned SWNT films (250 W/m-K). This result indicates that some alignment of the SWNT occurs during fiber formation. The thermoelectric power resembles that of SWNT mats: positive and moderately large (40 microV/K) at room temerature. This work was carried out in collaboration with CRPP/CNRS Bordeaux France and with Honeywell International.