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Electrical Transport in Long Bundles of Carbon Nanotube-Metal Hybrids SAIKAT TALAPATRA, RAKESH SHAH, CLAYTON SCHENK, XIANFENG ZHANG, Department of Physics, Southern Illinois University Carbondale, Illinois, 62901, SWASTIK KAR, Department of Physics, Applied Physics and Astronomy, Rensselear Polytechnic Institute, Troy, NY 12180 — Although a number of works have proposed that bundles of carbon nanotubes can withstand high current densities at low resistances for high-performance applications, such structures have been demonstrated to fall short of proposed expectations. This is chiefly due to limited access to all nanotubes in a bundle in conventional two-terminal device configurations, with low number of effective conducting channels. By depositing a small quantity of high-conductance metal alloys that wet the nanotube surface, our CNT-Au/Pd alloy hybrid conductors show improved performance in terms of failure current density and resistivity. Low temperature transport measurements show that the nanotube bundles with metal coating and especially after the high-bias treatment show more and more metallic nature, with decreased negative temperature coefficient of resistance. The results obtained will be discussed in the framework of transport theories of quasi-one dimensional systems.

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