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Transport properties of metallic nanocluster impregnated multi wall carbon nanotubes CATERINA SOLDANO, SWASTIK KAR, Rensselaer Polytechnic Institute, SAIKAT TALAPATRA, Southern Illinois University, SAROJ NAYAK, PULICKLE AJAYAN, Rensselaer Polytechnic Institute — Artificially engineered low-dimensional heterostructures form a class of extremely exciting new materials for fundamental and applied research. One such very interesting system is the formation of arrays of metallic nanoclusters confined to one-dimension, within the scaffolding of another one dimensional material. A good example of this kind of a system is metal-nanocluster-impregnated carbon nanotubes. In this work, we report the fabrication of nanoscale heterostructures in the form of ferromagnetic metal nanocluster array impregnated multi wall carbon nanotubes. The nanoclusters can be impregnated into the nanotubes by a simple electrochemical technique. Two and four terminal devices with such individual nanoarchitectures have been fabricated using a combination of photo- and focused ion beam lithography. The systems form extremely exciting platforms for investigating charge and spin transport in confined geometries. We present preliminary data on the electrical properties of these novel systems at room and low temperatures.

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