To be presented at the
American Physical Society 2005 Meeting
Los Angeles, California
March 21-25, 2005

Exploration of optical and electronic properties of SWNT networks for device applications

K. Xiao, M. Garrett, I.N. Ivanov, A.A. Puretzky, S. Jesse, P. F. Britt, D.H. Lowndes, and D. B. Geohegan

CNMS, Oak Ridge National Laboratory, Oak Ridge, TN 37831-6056

Submitted December 2004

Prepared by the
SOLID STATE DIVISION
OAK RIDGE NATIONAL LABORATORY
Managed by
UT-BATTELLE, LLC, for the
U.S. DEPARTMENT OF ENERGY
Under Contract No. DE-AC05-00OR22725

Exploration of optical and electronic properties of SWNT networks for device applications

K. Xiao, M. Garrett, I.N. Ivanov, A.A. Puretzky, S. Jesse, P. F. Britt, D.H. Lowndes and D. B. Geohegan

CNMS, Oak Ridge National Laboratory, Oak Ridge, TN 37831-6056
Contact e-mail: xk3@ornl.gov

Interconnected networks of single-walled carbon nanotubes (SWNTs) are rapidly gaining attention for macroscale electronics applications such as transparent conductive coatings or wiring, as well as printable transistors and sensors. In contrast to individual SWNT devices which must overcome the chirality and geometry variations inherent in most samples, networks of SWNT bundles naturally provide an ensemble average of semiconducting and metallic nanotubes which despite the advantages in processing must, however, be tailored for the particular application. SWNT networks have been deposited from solutions containing purified, laser-vaporization grown nanotubes onto optically transparent substrates for combined electrical and optical characterization. Specially-designed electrode structures were used to simultaneously perform UV-VIS-NIR spectroscopy and electrical characterization. Raman spectroscopy and scanning electron microscopy (SEM) were used to characterize the alignment and morphology of the networks.