

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Continuous and Scalable Fabrication of Transparent Conducting Thin Films of Single Walled Carbon Nanotubes BUDHADIPTA DAN, MAINAK MAJUMDAR, MATTEO PASQUALI, Rice University — We report the fabrication of optically transparent and electrically conducting thin films of single-walled carbon nanotubes (SWNT) using the industrially scalable, fast and simple process of Rod-Coating. Rheology was used to study four different surfactants, their capacity to disperse SWNT in water and the viscoelastic properties of the resulting dispersion. A combination of two different surfactants was found ideal to make a uniform dispersion with high concentration of SWNT and the specific viscoelastic properties desired for coating. Rod coating with this coating fluid produced highly uniform, transparent and conducting SWNT thin films. The films were also treated with various strong acids which lead to further significant improvement in properties. Our results show that the choice of surfactant for making the coating dispersion has a strong effect on the electro-optical properties of the SWNT films. Films with sheet resistance of 100 Ohm/sq and 300 Ohm/sq for respective transparency of 70% and 90%, in the visible region, were obtained with this process. The development of this continuous and scalable fabrication process will thus bring the SWNT films closer to commercial application.

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Date submitted: 27 Nov 2007

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