Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Observations of Simple and Complex Liquid Transport in Carbon Nanotubes[1] BYONG KIM, SHASHANK SINHA, HAIM BAU, University of Pennsylvania — Taking advantage of the optical transparency of template grown, carbon nanotubes (CNTs) with 15 nm thick walls, we studied experimentally and theoretically the capillary filling, condensation, and evaporation of glycerin, ethylene glycol, and DI water inside CNTs under room conditions [1]. All the liquids readily filled the CNTs by the action of capillary forces. The capillary filling was also used to study the filling of the tube with nanoparticles. Liquid, laden with 40nm-diameter fluorescent beads, was brought into contact with a 300nm diameter CNT. The liquid and the particles' transport were observed, respectively, with optical and fluorescence microscopy. Finally, a nanotube-based device that enables us to conduct controlled experiments of liquid and macromolecule transport with an electron microscope is described. [1] B. M. Kim, S. Sinha, and H. H. Bau, Nano Letters, 4, 2203 (2004).

[1]This work was funded by the National Science Foundation through grant NSF-NIRT 0210579 and the Commonwealth of Pennsylvanias Nano Institute.

Haim Bau
University of Pennsylvania

Date submitted: 04 Dec 2004 Electronic form version 1.4