Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Molecular motor powered nanotransportation guided by carbon nanotubes. A. SIKORA, J. RAMON-AZCON, K. KIM, WPI-AIMR, Tohoku University, Japan, K. REAVES, Materials Science and Engineering, Texas A&M University, H. NAKAZAWA, M. UMETSU, I. KUMAGAI, Department of Biomolecular Engineering, Tohoku University, Japan, T. ADSCHIRI, H. SHIKU, T. MATSUE, WPI-AIMR, Tohoku University, Japan, W. HWANG, Materials Science and Engineering; Department of Biomedical Engineering, Texas A&M University, W. TEIZER, WPI-AIMR, Tohoku University, Japan; Department of Physics and Astronomy/Materials Science and Engineering, Texas A&M University — Due to a decrease in the channel size of nanodevices, pressure-driven transport is increasingly limited by the fluid viscosity. This can be overcome by utilizing the motor protein kinesin that can walk processively along the microtubule filaments for active transport. However, using the kinesin-based transport system requires the ability to control the location and orientation of microtubules. We introduce functionalized multi-wall carbon nanotube (MWNT) tracks, aligned by dielectrophoresis, to guide kinesin powered microtubule shuttles. In order to resist shear flow and the force exerted by an electric field, the MWNT are attached to the surface via a biotin/streptavidin link. The configuration of the aligned MWNT is investigated using scanning electron microscopy and the guiding performance of the MWNT tracks is studied using fluorescence microscopy.

A. Sikora
WPI-AIMR, Tohoku University, Japan

Date submitted: 15 Nov 2013 Electronic form version 1.4