Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Water droplet distributions in pure and functionalized single walled carbon nanotubes CALLEN JOHNSON, The University of Tulsa, SUPRIYO GHOSH, XENIA TOMBOKAN, Bruker Corporation, PARAMESWAR HARI, The University of Tulsa, BRUKER CORPORATION TEAM, UNIVERSITY OF TULSA TEAM — In this study we investigated water droplet distribution in (1-2 nm diameter and 30 μs long) single walled carbon nanotubes (SWCNT) using time domain nuclear magnetic resonance (NMR). Annealing SWCNTs at 400 $^\circ$C resulted in a carbon nanotube with closed ends. We attached various amounts of water on the annealed SWCNT samples and measured the NMR spin-spin relaxation (T_2) distribution profile. The T_2 distributions were analyzed using the inverse Laplace transform to estimate the amount of water attached to the SWCNT. We performed NMR measurements on water distributions in pure CNT and functionalized CNT with OH and COOH radicals. The T_2 distribution curves for pure and functionalized SWCNTs show significant difference in water attachment. We also studied water distribution profile with the SWCNTs annealed at 800 $^\circ$C. Annealing at 800 $^\circ$C opens the ends of the SWCNTs. T_2 distribution curves at 400 $^\circ$C and 800 $^\circ$C will be compared to obtain the amount of free water attached on the outer and inner surface of pure and functionalized SWCNTs.

Callen Johnson
The University of Tulsa

Date submitted: 27 Nov 2010 Electronic form version 1.4