

Functionalization of Carbon Nanotubes

James M. Tour
Chao Professor of Chemistry
Professor of Mechanical Engineering and Materials Science
Professor of Computer Science
Department of Chemistry and Center for Nanoscale Science and Technology,
Rice University
P.O. Box 1892, MS 222, Houston, Texas 77251-1892
Email: tour@rice.edu
Web: <http://www.jmtour.com>

Routes to functionalization and characterization of carbon nanotubes will be discussed. This will include a solvent-free process that makes the functionalized systems accessible at low cost. Blending <1 wt % of these functionalized materials into commodity elastomers can increase the tensile modulus several-fold, while retaining the original elongation-to-break properties. Secondly, blending 1 wt % nanotubes into commodity plastics, followed by short (3 second) exposure to low power microwaves (60 W) can result in crosslinks at the exposed locations for localized modulus changes. Functionalizations in fuming sulfuric acid provide individualized functionalized nanotubes. The functionalization of the metallic tubes can be conducted, thereby providing a handle for the separation from the semiconducting species.