

Abstract Submitted
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Magnetic Carbon Nanotubes
Tethered with Maghemite Nanoparticles IL TAE KIM, GRADY NUNNERY,
KARL JACOB, School of Materials Science and Engineering, Georgia Institute of
Technology, Atlanta, GA, 30332, JUSTIN SCHWARTZ, XIAOTAO LIU, National
High Magnetic Field Laboratory, Florida State University, Tallahassee, FL, 32310,
RINA TANNENBAUM, School of Materials Science and Engineering, Georgia Insti-
tute of Technology, Atlanta, GA, 30332 — We describe a novel, facile method for the
synthesis of magnetic carbon nanotubes (m-CNTs) decorated with monodisperse γ -
 Fe_2O_3 magnetic (maghemite) nanoparticles and their aligned feature in a magnetic
field. The tethering of the nanoparticles was achieved by the initial activation of
the surface of the CNTs with carboxylic acid groups, followed by the attachment of
the γ - Fe_2O_3 nanoparticles via a modified sol-gel process. Sodium dodecylbenzene
sulfonate (NaDDBS) was introduced into the suspension to prevent the formation of
an iron oxide 3D network. Various characterization methods were used to confirm
the formation of well-defined maghemite nanoparticles. The tethered nanoparticles
imparted magnetic characteristics to the CNTs, which became superparamagnetic.
The m-CNTs were oriented parallel to the direction of a magnetic field. This has the
potential of enhancing various properties, e.g. mechanical and electrical properties,
in composite materials.

Il Tae Kim
School of Materials Science and Engineering,
Georgia Institute of Technology, Atlanta, GA, 30332

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