

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  $\gamma$ -  
 $\text{Fe}_2\text{O}_3$  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  $\gamma$ - $\text{Fe}_2\text{O}_3$  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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