

MATERIALS RESEARCH SOCIETY
SYMPOSIUM PROCEEDINGS VOLUME 1505

Carbon Nanomaterials

November 25 - 30, 2012
Boston, Massachusetts, USA

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571
www.proceedings.com

ISBN: 978-1-63266-098-5

Some format issues inherent in the e-media version may also appear in this print version.

©Materials Research Society 2013

This reprint is produced with the permission of the Materials Research Society and Cambridge University Press.

This publication is in copyright, subject to statutory exception and to the provisions of relevant collective licensing agreements. No reproduction of any part may take place without the written permission of Cambridge University Press.

Cambridge University Press
Cambridge, New York, Melbourne, Madrid, Cape Town,
Singapore, São Paulo, Delhi, Tokyo, Mexico City

Cambridge University Press
32 Avenue of the Americas, New York, NY 10013-2473, USA
www.cambridge.org

Materials Research Society
506 Keystone Drive, Warrendale, PA 15086
www.mrs.org

CODEN: MRSPDH

ISBN: 978-1-63266-098-5

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-part Internet Web sites referred to in this publication and does not guarantee that any content on such Web sites is, or will remain, accurate or appropriate.

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

Fabrication of Patterned Carbon Nanotube Field Emission Surfaces on SiC Substrates	1
<i>M. Pochet, J. Campbell, R. Coutu, S. Fairchild, J. Boeckl</i>	
Graphene Research in China	7
<i>K. Chen</i>	
Mechanical and Thermal Properties of Graphene Nanomeshes	11
<i>N. Mosterio, A. Fonseca</i>	
Electron Spin Flip Scattering In Graphene Due To Substrate Impurities	17
<i>A. Goswami, Y. Liu, F. Liu, P. Ruden, D. Smith</i>	
Broad-band, High-efficiency Optical Absorbers Derived From Carbon Nanomaterials	23
<i>A. Kaul, J. Coles, M. Eastwood, R. Green, P. Bandaru</i>	
Indium Plated Carbon Nanotubes Pattern On Flexible Substrate Defined By Ink-Jet Printing	29
<i>P. Xu, M. Hamilton</i>	
Transportation of Hydrogen Molecules Enabled by Torsional Buckling Instability of Carbon Nanoscrolls	35
<i>Y. Huang, T. Li</i>	
Synthesis of a New Class of Molecule $\text{Li}^+@C_{60}\text{O}^-(\text{OH})_7$ as a “Cation-Encapsulated Anion Nanoparticle” by Multihydroxylation of Li-Encapsulated Fullerene	40
<i>H. Ueno, Y. Nakamura, N. Ikuma, K. Kokubo, T. Oshima</i>	
Quinone/Hydroquinone Redox Couple As A Source Of Enormous Capacitance Of Activated Carbon Electrodes	46
<i>K. Fic, M. Meller, G. Lota, E. Frackowiak</i>	
Thermo-Physical Behaviors Of Carbon Nanofiber Reinforced Polylactic Acid	52
<i>A. Adhikari, K. Sarkar, K. Lozano</i>	
The Role of Contact Adhesion in Friction and Wear of Graphene under Sliding Conditions	57
<i>E. Sandoz-Rosado, E. Terrell</i>	
Enhanced Performance of Symmetric Double Layer Capacitor by Flexible Binder-free SWCNT Membrane Electrodes	63
<i>D. Ma, J. Kalupson, P. Shetty, K. Adu, R. Rajagopalan</i>	
First-Principles Calculation of the Electronic Properties of Single-Walled Carbon Nanotubes under Torsions	69
<i>K. Mihara, K. Shintani</i>	

Nonionic Electrophoretic Sorting of SWCNTs into Metallic and Semiconducting Tubes	75
<i>K. Johns, K. Koontz, D. Ma, K. Carruba, K. Adu</i>	
Highly-Tunable Polymer/CNTs Nanostructures: A Rapid and Facile Approach for Controlled Architecture and Composition	80
<i>G. Mechrez, R. Suckeveriene, M. Narkis, E. Segal</i>	
Synthesis, Properties, and Applications of Hydrophilic Hollow Carbon Nanoparticles from C₆₀ and its Soot	86
<i>K. Kokubo, H. Ueno, Y. Nakamura, S. Yamakura, T. Oshima</i>	
Optoelectronic Properties of Graphene-MoS₂ Hybrid	93
<i>M. Padmanabhan, K. Roy, S. Goswami, T. Sai, G. Ramalingam, S. Kaushal, S. Raghavan, A. Ghosh</i>	
Electronic Transport and Doping Effects in Reduced Graphene Oxide Measured by Scanning Probe Microscopy	99
<i>C. Kehayias, S. MacNaughton, S. Sonkusale, C. Staii</i>	
Graphene-Like Nanostructures Obtained From Biomass	105
<i>G. Barin, H. Santos, J. Rocha, L. Costa, A. Filho, I. Gimenez, L. Barreto</i>	
Mechanical Properties of Pillared-Graphene Nanostructures under Shear Loads	111
<i>H. Sasaki, T. Hagi, K. Shintani</i>	
Biaxially Stretchable Transparent Conductors That Use Metallic Single-Walled Carbon Nanotube Films	118
<i>X. Ho, J. Tey, W. Liu, C. Cheng, J. Wei</i>	
Concentrated Solutions of Highly Conductive Pyrene-Functionalized Carbon Nanotubes Suitable for Printing	125
<i>C. Landorf, J. Lamb, W. Shih, V. Kayastha, J. Bledsoe, J. Garrison, M. Nelson</i>	
Synergism In Binary (MWNT, SLG) Nano-Carbons In Polymer Nano-Composites: A Raman Study	131
<i>P. Xu, J. Loomis, B. King, B. Panchapakesau</i>	
The Effects of Pulsed Green Laser Annealing for Carbon NanoWalls (CNWs)	137
<i>N. Kawaguchi, A. Yoshimura</i>	
The Physical Essence of Mono-dispersed Nanometer Particle Surface Energy by Boundary Bond Interaction	143
<i>L. Su, X. Yin, C. Wan, S. Qiao</i>	
Pulsed Electron Beam Deposition of Nanocrystalline Diamond	150
<i>R. Henda, O. Alshekhli</i>	
Growth of Carbon Nanotubes on Mesoporous Silica Coated Planar and Three-Dimensional Surfaces	156
<i>K. Staggemeier, J. ke, A. Downard, V. Golovko, N. Chopra, M. Bakker</i>	
A Study on Mechanical Properties of CNT Reinforced Carbon/Carbon Composites under Environment Aging Effects	162
<i>M. Shen, Y. Li, H. Su, C. Chiang, Y. Hsiao, M. Sung, M. Yip</i>	

Graphene Terahertz Lasers: Injection versus Optical Pumping	168
<i>T. Otsuji, A. Satou, M. Ryzhii, V. Mitin, V. Ryzhii</i>	
Using Hydrothermal Method to Prepare Reduced Graphene-Hemin Electrochemical Biosensor for Tyrosine Detection	180
<i>J. Wei, J. Qiu</i>	
A Model Dielectric Function for Graphene from the Infrared to the Ultraviolet	187
<i>A. Boosalis, R. Elmquist, M. Real, N. Nguyen, M. Schubert, T. Hofmann</i>	
Anti-Bacterial Property Of Hydrogen-Free Amorphous Carbon Coatings On Ar Plasma-Pretreated Polytetrafluoroethylene (PTFE) With A-C:H:F Interlayer	193
<i>H. Umemoto, T. Hasebe, R. Kasai, Y. Yoshimoto, S. Nagashima</i>	
Effect of SWCNT Dilution on the Resistivity of MgB₂	199
<i>D. Ma, R. Jayasingha, D. Hess, K. Adu, G. Sumanasekera</i>	
3 Dimensional Carbon Nanostructures for Li-ion Battery Anode	205
<i>C. Kang, R. Baskaran, W. Kim, Y. Sun, W. Choi</i>	
Optical Hall Effect Measurement Of Coupled Phonon Mode - Landau Level Transitions In Epitaxial Graphene On Silicon Carbide	211
<i>P. Kuhne, A. Boosalis, C. Herzinger, L. Nyakiti, V. Wheeler, R. Myers-Ward, C. Eddy Jr., D. Gaskill, M. Schubert, T. Hofmann</i>	
Author Index	