

Carbon Nanomaterials: The route toward applications in energy

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ABSTRACT

This talk will focus on the engineering of carbon nanomaterials, graphene and carbon nanotubes (CNTs), and their applications in energy storage and generation. Particularly the interfaces of graphene/substrates and CNTs/substrates will be highlighted towards high efficiency Li-ion battery, field emission, and flexible solar cells. Our recent development of new structures of multifunctional metal-graphene-CNTs and 3D graphene/CNTs will be presented. The three-dimensional nanostructured hybrid materials, with better interfacial contacts and volume utilization, can stimulate the development of several energy-efficient technologies. The unique 3D design of the electrode allowed much higher solid loading of active anode material and resulted in more amount of Li^+ ion intake in comparison to those of conventional 2D anode. Our recent results of bonding energy characterization in nano scale will also be introduced to offer the optimum interfacial structure of carbon nanomaterials/substrates. We measured the nano-scale graphene/metal adhesion energy on metal substrates and silicone substrate at various conditions. Our efforts on the strategies of manipulation of carbon nanomaterials towards high efficiency energy applications will be reviewed and critical issues will be discussed.

BIOGRAPHY

Dr. Choi obtained his Ph.D in Materials Science and Engineering from the North Carolina State University (NCSU) in 1997. After his PhD, Dr. Choi worked in the industry research laboratory as a senior researcher and project manager at Samsung (SAIT). He was a leading scientist in the "Carbon Nanotubes for Tera-level Nano electronics Device" project with more than \$1.0 M/year support from SAMSUNG and the Government of Korea. One of the remarkable achievements in his research career was the invention of "Carbon Nanotube Field Emission Display", which was reported in Science, covered extensively by news media around the world, and led to a recent demonstration by SAMSUNG of over 40-inch field emission flat panel display. Some of his innovations, reported as news in the TRN News, MIT's Magazine, Analytical Chemistry, Nanowork, Nature Nanotechnology and TMS, were the first to show practical ways of making nanomaterial-based devices. Dr. Choi is the author/co-author of over 70 patents, 1 book, 7 book chapters, and over 180 publications, which been cited more than 4,300 times with H-index of 32. He serves on the Editorial Board of 5 journals including the Topical editor of Current Applied Physics (Elsevier). Choi has been awarded the prestigious Materials Research Society (MRS) Medal for 2006. He awarded MRS fellow as the youngest person named as a Fellow in 2009.



EVENT DETAILS

DATE:

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ATTENDANCE:

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