

“Tailoring Processes and Assembly of Nanomaterials for Electrochemical Energy Storage”

Wednesday
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3:00 pm
Wu and Chen Auditorium
Levine Hall



Yong Lak Joo

BP Amoco/H. Laurance Fuller Professor
School of Chemical and Biomolecular Engineering
Cornell University

Abstract

Despite their promise to mitigate many problems and offer new opportunities in energy storage systems, nanomaterials have proven to be difficult to tailor and preserve their assembly throughout manufacturing processes when a scale-up is considered. My group has been working on understanding and modification of instability-driven processes to devise scalable manufacturing processes such as gas-assisted electrospinning and air-controlled electrospray, which can also provide the tailored assembly of nanomaterials. I will show several examples of using these processes to assemble various nanomaterials in the development of next generation battery materials, including: 1) thermally stable, non-flammable polymer/ceramic hybrid separator and high capacity silicon/graphene anode for high performance Li-ion batteries; and 2) graphene coated separator and highly loaded, layered sulfur/graphene cathode for high rate Li-sulfur batteries.

Bio

Yong Lak Joo is the BP Amoco/H. Laurance Fuller Professor in the School of Chemical & Biomolecular Engineering at Cornell University. He is currently the Associate Dean of the Masters of Engineering Programs and Interim Associate Dean for Research and Graduate Studies in the College of Engineering. He received his B.S. degree at Seoul National University in Korea in 1989, and received his Ph.D. in Chemical Engineering at Stanford University in 1993. From 1993 to 1999, he was a senior research engineer at Hanwha Chemical Corporation in Korea. Prior to joining Cornell in 2001, Yong Lak Joo did two years of postdoctoral research in the Department of Chemical Engineering at MIT.

His research focuses on the integration of molecular details into a macroscopic level in scalable nanomaterials processing. He is a fellow of the American Institute of Chemical Engineers (AIChE). He received a 3M Faculty Award and is the recipient of a National Science Foundation CAREER Award, as well as a DuPont Young Professor Award. He has also received an Excellence in Teaching Award from the College of Engineering at Cornell University.