

Industrial Engineering Seminar Series



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Centre for Renewable Energy Technology
Northeastern University, Boston, MA

Lithium Ion Batteries Present Status and Future Trend

Tuesday - March 20, 2012

4:30 – 5:30pm

Krannert Auditorium – Room 140

ABSTRACT

Lithium ion batteries have been an essential component in the modern portable electronic technology revolution and are indispensable for everyday life. This talk will provide a brief overview of the technology including the evolution of the many materials and battery systems to the present state-of-the-art, and the anticipated future trends. The energy density and cost of lithium ion batteries will be discussed along with a look at their advantages and limitations for the myriad power hungry applications in portable electronics, transportation and energy storage. The future trend for developing ultra-high energy density rechargeable batteries will be discussed with an update on Li-air and Li-sulfur systems.

AUTHOR BIO

Prof. K. M. Abraham has had a thirty five year industrial and academic career in the research and development of rechargeable lithium batteries. In the early nineteen eighties he and his colleagues at EIC Laboratories, Inc. were the first to demonstrate practical rechargeable lithium batteries with long cycle life. His work on gel polymer electrolytes, particularly those supported on micro-porous polymer membranes, form the basis of commercial lithium-ion polymer batteries. Dr. Abraham is the inventor of many new lithium and sodium chemical couples including the ultrahigh energy density lithium-air battery, which is the highest energy density battery that can be practically developed. His unique background includes both an in-depth understanding of battery materials science and battery engineering. He has designed and developed a variety of lithium-ion batteries for portable electronics, power tools, HEV and, PHEV. His current research at Northeastern University focuses on the electrochemistry of Li-air batteries, and novel cathode materials and electrode structures for Li-ion batteries.

Dr. Abraham received his undergraduate education in chemistry, physics and mathematics from St Berchmans' College of Kerala University, India, where he was a gold medallist and a National Merit Scholarship winner. He received his Ph.D. degree in Chemistry from Tufts University, Medford, MA and conducted post-doctoral research at Vanderbilt University and Massachusetts Institute of Technology. Dr. Abraham is currently Research Professor at Northeastern University Center for Renewable Energy Technologies, Northeastern University, Boston, MA. He is also the principal of E-KEM Sciences, a battery consulting company in Needham, MA. He was previously President of Covalent Associates, Inc, Woburn, MA, and, Senior Scientist, Group Leader, Vice President and Director of Battery Research and Development at EIC Laboratories, Inc., Norwood, MA where he carried out most of his pioneering work on lithium batteries