



Phi Lambda Upsilon Alpha Epsilon Chapter



College of Arts and Sciences
Department of Chemistry

PLU Distinguished Lecture Series

Thursday, 15th April 2021 | 10.00 am | Virtual
Zoom meeting ID: 933 9477 5559

“Sustainable Battery Technologies for Renewable Energy Utilization and Vehicle Electrification”



Prof. Arumugam Manthiram

Walker Department of Mechanical Engineering
Director of the Texas Materials Institute
University of Texas, Austin

Abstract: Rapid increase in global energy use and growing environmental concerns have prompted the development of clean, sustainable, alternative energy technologies. Renewable energy sources like solar and wind are a promising solution, but electrical energy storage (EES) is critical to efficiently utilize electricity produced from renewable sources as they are intermittent. Rechargeable batteries are prime candidates for EES, but their widespread adoption for electric vehicles and grid electricity storage requires optimization of cost, cycle life, safety, energy density, power density, and environmental impact, all of which are directly linked to severe materials challenges. This presentation will focus on the development of sustainable battery chemistries and advanced materials for near-term and long-term battery technologies. Particularly, lithium- and sodium-based batteries that are free from expensive and scarcely available cobalt as well as those based on sulfur will be presented. The challenges of bulk and surface instability and chemical crossover during charge-discharge cycling, dynamics and stabilization of lithium plating and stripping, advanced characterization methodologies to develop an in-depth understanding, and approaches to overcome the challenges will be presented.

Bio: Arumugam Manthiram is the Cockrell Family Regents Chair in Engineering and Director of the Texas Materials Institute at the University of Texas at Austin (UT-Austin). After receiving his Ph.D. in chemistry from Indian Institute of Technology Madras in 1981 and working as a postdoctoral researcher at the University of Oxford and at UT-Austin with 2019 Chemistry Nobel Laureate John Goodenough, he became a faculty member in the Department of Mechanical Engineering at UT-Austin in 1991. His research is focused on batteries and fuel cells. He has authored 830 journal articles with 74,000 citations and an h-index of 134. He has mentored 265 students and postdoctoral researchers, including the graduation of 63 Ph.D. students.

Dr. Manthiram is a Fellow of six professional societies: Materials Research Society, Electrochemical Society, American Ceramic Society, Royal Society of Chemistry, American Association for the Advancement of Science, and World Academy of Materials and Manufacturing Engineering. He is an elected member of the World Academy of Ceramics. He received the university-wide (one per year) Outstanding Graduate Teaching Award in 2012, Battery Division Research Award from the Electrochemical Society in 2014, Distinguished Alumnus Award of the Indian Institute of Technology Madras in 2015, Billy and Claude R. Hocott Distinguished Centennial Engineering Research Award in 2016, Honorary Mechanical Engineer of the ME Academy of Distinguished Alumni Award in 2019, Henry B. Linford Award for Distinguished Teaching from the Electrochemical Society in 2020, and the International Battery Association Research Award in 2020. He is a Web of Science Highly Cited Researcher every year since 2017. He delivered the 2019 Chemistry Nobel Prize Lecture in Stockholm on behalf of Professor John Goodenough.