

Performance of graphene materials in energy storage applications

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In BASF at the Carbon Materials Innovation Center (CMIC), advanced carbon materials are being investigated for several potential fields of application such as electronics, catalysis, and energy storage and conversion devices. Graphene, one such advanced and emerging carbon material has recently spurred strong interest of scientific research both in academia and industry owing to its remarkable properties. For example, owing to its higher electrical conductivity, graphene is proposed as a new carbon material to replace or complement traditional carbon black additives in lithium-ion batteries as well as activated carbon in supercapacitor devices. Recent results from our lab using few layers graphene (FLG) in electrochemical capacitor and lithium ion battery applications will be presented. In electrochemical capacitor applications, FLG shows higher power density and lower energy density compared to the state of the art activated carbon. In lithium ion battery applications, addition of FLG materials to anode formulation containing silicon (Si) anode slurries leads to improvement in capacity fading. Finally the talk will present the challenges lie ahead for the commercialization of FLG to make it to reality in the near future.

Speaker Biography:

Dr. Shyam S. Venkataraman is the Project Manager in CMIC at BASF SE, Germany. He received his Bachelor of Technology in Chemical and Electrochemical Engineering from Central Electro Chemical Research Institute (CECRI), India (2004), Master of Science in Analytical Chemistry from University of North Texas (2007), USA and PhD in Analytical Chemistry from Clarkson University (2012), USA. He worked as R&D manager at BASF Electronic Materials, Taiwan from 2010 to 2012. Since April 2012, he is leading a team in CMIC focusing on the preparation of advanced carbon materials and its application in energy storage and conversion devices. He has given 20 scientific presentations, filed 20 patent applications and co-authored 6 scientific papers in the area of graphene electrochemistry, copper electro-deposition and corrosion, formulation of silica and ceria polishing slurries and wafer cleaning solutions for hard disk drive and integrated circuits fabrication.