

New Ionic Liquids and Nanocrystalline Electrode Materials and for the Conversion of Sunlight to Electric Power and its Storage in Lithium Ion Batteries

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Our pioneering studies on nanocrystalline lithium ion insertion materials date back to year 1995 [1,2], when we discovered that reducing the particle size of the active material to the nanometer size offered a very attractive opportunity to realize high power lithium batteries, even by using materials that show very low bulk values for the lithium ion diffusion coefficients. Starting with this discovery the lecture will present our latest progress in this exciting new area focusing on i) charge transport along the surface of electronically insulating battery materials by molecular wiring [3] , ii) enhanced inter-particle transport by carbon nanotubes and iii) achievement of excellent power rates with lithium manganese phosphate/carbon nanocomposites [4]. Our recent work new eutectic ionic liquids and their practical applications in mesoscopic solar cells will for the generation of electric power from sunlight will also be discussed [5].

Literature:

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