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Abstract

Nano Materials synthesis, characterization, and its applications

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Abstract:

Functional Materials will play a important role in the area of energy and environmental, health and other advance applications. In my talk i will discuss various nanomaterial's synthesis, characterization techniques, fundamentals and applications in the area of batteries (Li, Na), electrolyte, super capacitor and solar cells, electro catalysis and photo catalysis applications. Various preparation methods (Molten salt, Graphenothermal/ carbothermal, precipitation, Hydrothermal, Combustion, Ball -milling, solgel and Nitration, fluorination) of the battery materials and physical techniques like Rf supttering. Materials characterization techniques like Rietveld refinement X-ray diffraction, Rutherford backscattering (RBS), Neutron diffraction, X-ray absorption spectroscopy (XPS), SEM, TEM, XPS, Raman/IR density and BET surface area methods will be discussed. Use of electroanalytical studies like cyclic voltammetry, galvanostatic cycling and impedance spectroscopy techniques for testing and analysis of battery materials, and insitu and ex-situ studies.

Key Words: Functional Materials; Energy storage and conversion; Nanotechnology; applications ; physical and chemical properties of Materials.

Biography:

Dr. M.V. Reddy is Senior Researcher at Institute of Research Hydro-Quebec, Montreal, Canada, He obtained his Ph. D (2003) (mention with highest honors) in the area of Materials Science from ICMCB-CNRS)/ENSCPB, University of Bordeaux, France. From July 2003- April 2019, he worked in Departments of Physics, Materials Science & Engineering and Chemistry, National University of Singapore (NUS), Singapore as senior Research fellow. For the last 20 years, he has been working on the nano/submicron sized materials for Li-ion battery materials (cathodes, anodes, supercapacitors and solid electrolytes), including novel methods of synthesis, characterization and evaluation of the electrochemical properties. He has

published over 200 papers in various international journals and he gave 80 talks (Plenary, keynote and Invited talks) at various conferences. His h-index; 61 and 14000 citations (source google scholar). He authored a landmark publication on electrode materials for lithium-ion batteries and their reaction mechanisms that appeared in Chemical Reviews (impact factor over 54; the paper has been cited over 2300 times since 2013). He trained many local high school/college and International exchange students and Ph.D students.

Recent Publications:

1. Electrochemistry-related aspects of safety of graphene-based non-aqueous electrochemical supercapacitors: A case study with MgO-decorated few-layer graphene as the electrode.
2. Synthesis, structural and lithium storage studies of graphene-LiVSi2O6 composites.
3. Enhanced Electrochemical Performance of Electrospun V2O5 Fibres Doped With Redox-inactive Metals.
4. Comparison of Structural and Electrical Behaviour of Phospho-Olivine LiNiPO4 and LiNi0.8Mn0.1Co0.1PO4 for High Voltage Rechargeable Li-Ion Batteries

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