Department of Physics
Central University of Tamil Nadu
Thiruvarur-610 005

Departmental Seminar

Exotic Materials' Discovery for Sustainable Infrastructure

Name of the Speaker: Dr. Sesha S.Srinivasan, Florida Polytechnic University, Lakeland, Florida,USA
Date: 17th July 2017 (Monday) Time: 02:30 pm
Venue: Seminar Hall (GF), Department of Physics, CUTN.

Abstract and Bio-sketch

In this presentation, novel and exotic materials' synthesis, optimization, characterization and property measurements are discussed based on their potential for chemical, electrochemical, photocatalytic, hydrogen production and storage and other industrial applications. The wide range of inorganic and organic materials' development from this study include high temperature metals and alloys, quasi crystalline materials, Mg based composites, multi-component electrode materials, single or multi-phase complexes, light-weight ternary, pseudo-ternary, quaternary and multinary hydrides, nanoparticulates of heterogeneous semiconductor oxides, soft materials such as polymer nanofibers, carbonnanotube and grapheme etc. For the synthesis of these materials, *state-of-the-art* tools and processes such as radiofrequency induction(spin) melting; mechanical alloying using high energy ball mill; co-precipitation and hydrolysis process by sol-gel route; high temperature sintering and annealing; chemical, solvo-thermal and hydro-thermal processes; reactive and solvent mediated mechanochemical milling, high performance encapsulation, chemical templating and electrospinning methods have been employed extensively. Various characterization methods namely structural, microstrucutral, elemental, chemical, surface/interface, thermal, volumetric, gravimetric, gassorption and gas quantification, have been carried out using XRD, HRTEM, SEM, EDAX, DSC, TGA, PCT, BET, FTIR, RAMAN, UV-Vis, GC/MS, Atomic Absorption, Neutron diffraction and other related techniques. The structure-property relations of these materials have been analyzed based on both experimental and theoretical calculations. Potential applications based on these exotic materials' development for (i) reversible hydrogen storage in both stationary and on-board vehicles, (ii) indoor water/air detoxification and disinfection, (iii) BP Oil-spill crisis, (iv) fuel production using photoreduction etc., are discussed briefly during this presentation.

BIO-SKETCH OF DR. SESHA S.SRINIVASAN

Dr. Sesha Srinivasan is currently an Assistant Professor of Physics, at Florida Polytechnic University, Florida, USA. Before moving to FPU in 2014, he was a Tenure Track Assistant Professor of Physics, at Tuskegee University, Alabama, USA. Dr.Srinivasanhas more than a decade of research experience in the interdisciplinary areas of Solid State and Condensed Matter Physics, Inorganic Chemistry, Chemical and Materials Science Engineering. His PhD., problem focused on the development various rare-earth, transition metals and intermetallic alloys,composites,nanoparticles and complex hydrides

for reversible hydrogen storage applications. Dr. Srinivasan and his Ph.D advisor, Padamashree Professor O.N.Srivastava (BHU, Varanasi), have successfully converted a 4-stroke, 100 cc Honda motorcycle to run on Hydrogen gas, which was delivered from the on-board metal hydride canister. After his PhD., completion, Dr. Srinivasan joined the research team of Professor Craig Jensen as a Post Doctoral Fellow in the Department of(Inorganic)Chemistry, University of Hawaii, Honolulu, Hawaii,USA. He and his Post Doctoral advisor has extensively collaborated with Scientists around the world for the hydrogen storage on light weight complex hydrides which were funded by the US Department of Energy (DOE) and WE-NET, Japan. After two years at University of Hawaii, he has joined as a Research Scientist, Clean Energy Research Center(CERC) at University of South Florida under the leaderships of Professor Elias Stefanakos and Professor Yogi Goswami. He has established *state-of-the-art* research laboratory at the CERC and supervised several graduate and undergraduate students for their Masters and PhD dissertations. He has also served as an Associate Director of Florida Energy Systems Consortium(FESC) at USF to co-ordinate number of research projects on clean energy and environment, which was funded by the State Energy Office Florida($9Mgrant). In his current and previous positions at TU and FPU, Dr. Srinivasan was awarded many research grants, worth of $1M from both federal(DOE,NSF,ONR), state(FESC,FHI,FPU) and private(BP-Oil Spill, Quantum SphereInc.) funding sources. He has recently awarded with two US patents on Hydrogen storage nano-materials' development and methodologies. He published ten book chaptersand review articles, more than 75 journal publications and many more peer-reviewed conference proceedings. Dr. Srinivasan has served as a reviewer in the panel review committee of the National Science Foundation(NSF), SMART and NDSEG panels of ASEE, ad-hoc merit review committee of US Department of Energy and panelist for Qatar National Research Fund (QNRF). Dr. Srinivasan currently serves as an Associate Editor of deGruyter Open Book publications in Physics, Materials Science and AstronomyandGuest Editor for the special issue in Applied Sciences an open access journal of MDPI Publications. He is currently on the Editorial board of Sci Know journal publications and Datasets International Journal on Materials Science. He is serving as member affiliate of Indo-Universal Collaboration on Engineering Education(IUCEE). Dr. Srinivasan was aguest speaker on ***"GreenEnergy"*** at the 95th Indian Science Congress. Dr. Srinivasan with his colleague recently won a three years Indo-US collaborative projectonGreen Chemistry, Engineering and Technologies with Panjab University, Chandigarh, India. Hehasorganized many national and international conferences on expertise topics of clean energy, nanotechnology, and sustainability. He has recently awarded with FPU Faculty Assembly's Research Excellence Award. He is the 1st rank holder and Gold Medalist in his Bachelors and Masters Degrees in Physics from Bharathidasan University, India. Dr. Srinivasan can be reached at ssrinivasan@flpoly.org.

All are welcome