

Vasu shanmugam

Junior Scientist

7th floor, Center for Automotive Energy Materials (CAEM)

International Advanced Research Center for Powder Metallurgy and New Materials-(ARCI)

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Email id: mm15d007@smail.iitm.ac.in,vasuphy07@gmail.com, vasu@project.arci.res.in**EDUCATION:**

- ❖ PhD 2015-present
Supervisor: Prof: G.Sundararajan,
(Metallurgical and Materials Engineering),
Indian Institute of Technology Madras-IITM,
- ❖ Master of Science (M.Sc.) 2010-2012
Materials Science
Anna University, Chennai-Tamilnadu, India
- ❖ Bachelors of Science (B.Sc) 2007 -2010
Physics,
Thiruvalluvar University, Vellore –Tamilnadu, India

RESEARCH EXPERIENCE:

- Designation: Junior Scientist 2013 -presnt
Center for Automotive Energy Materials (CAEM)
International Advanced Research Center for Powder Metallurgy and New Materials-(ARCI)

Project Title: Development of Lithium ion batteries for Electric vehicle applications

High light:

- ❖ Pilot plant level -fabrication of Lithium ion batteries by commercially purchased LiFePO₄ based chemistry.
- ❖ In-Houses Synthesis and Scale of indigenous active materials for Lithium ion batteries
 - $\text{Li}(\text{Ni}_{(1-x-y)}\text{Co}_x\text{Mn}_y)\text{O}_2$
- ❖ Research and Development of New electrode Materials
 - $(1-X)\text{Li}_2\text{MnO}_3 : X(\text{Li Ni}_{0.33}\text{Co}_{0.33}\text{Mn}_{0.33})\text{O}_2$

➤ Lithium rich Manganese Based Layered oxide

- Designation :Project Associate 2012-2013

Supervisor: Dr. SudakarChandran, Associate Professor

Department of Physics, IITMadras, India

Project Title: Development of cathode and anode electrode Materials for Lithium ion Batteries-Renault Nissan Research Fund.

Highlight:

- ❖ Antisite defect controlled LiFePO_4 synthesis by hydrothermal method as cathode materials for Lithium ion batteries
- ❖ Silicon nanotube fabrication on silicon substrate by Electrochemical Etching as anode material For Lithium ion batteries

PATENT:

“A Process for in-situ carbon coating on alkali transition metal oxide” for cathode materials for Lithium ion and sodium ion batteries. Patent No: IN 201611007461

PUBLICATION:

M. B. Sahana, **S. Vasu**, N. Sasikala, S. Anandan, H. Sepehri-Amin, C. Sudakar and R. Gopalan Raman spectral signature of Mn-rich nanoscale phase segregations in carbon free $\text{LiFe}_{1-x}\text{Mn}_x\text{PO}_4$ prepared by hydrothermal technique, RSC Adv., 2014,4, 64429-64437.

S. Vasu Moodakare B. Sahana Chandran Sudakar R. Gopalan G.Sundararajan In-situ Carbon Encapsulation of $\text{LiNi}_{1/3}\text{Co}_{1/3}\text{Mn}_{1/3}\text{O}_2$ Using Pillared Ethylene Glycol Trapped in the Metal Hydroxide Interlayers for Enhanced Cyclic Stability. Electrochimica Acta 251 (2017) 363–377.

PRESENTATIONS:

IUMRS-ICA-2013, Structure –Electrochemical properties correlation LiFePO_4 prepared by Hydrothermal Method. Vasu.S, Sahana.M.B, Gopalan.R, and Sudakar Chandran

EMSI 2015,Evidence for composite nature of $\text{Li}_{1.15}\text{Mn}_{0.54}\text{Ni}_{0.23}\text{Co}_{0.08}\text{O}_2$ from high resolution transmission electron microscopy.M. B. Sahana, S.Vasu, N. Sasikala, K. Tanuja, and R. Gopalan

IUMRS-ICEM 2016, Effect of co-precipitation parameters of layered hydroxide on voltage hysteresis of $\text{LiNi}_{1-x-y}\text{Co}_x\text{Al}_y\text{O}_2$. M.B. Sahana N. Sasikala, S. Vasu , Prathap Haridoss and R. Gopalan.

MCARE 2017, Enhanced cyclic stability of In-situ carbon coated $\text{LiNi}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ cathode materials for lithium ion batteries, G. Sundararajan, S. Vasu M. B. Sahana and R. Gopalan

ICMAT 2017, Increased cyclic stability of uniform carbon coated lithium stoichiometric layered and Li-excess Mn-based transition metal oxide materials, R. Gopalan, S. Vasu and M. B. Sahana

TECHNICAL SKILLS:

Hand on operating

- ❖ TGA-DSC with coupled Mass Spectrometer
- ❖ Ion Chromatography
- ❖ X-ray diffractometers
- ❖ Fourier –Transformed Infrared spectroscopy
- ❖ Raman Spectroscopy
- ❖ Hands on Experience in Glove box operation.
- ❖ Battery Cycler
- ❖ Electrochemical Impedance Spectroscopy
- ❖ Lithium ion full cell design and fabrication at pouch cell level and pilot plant level for high energy density applications

Areas of Expertise:

- ❖ Structure –Electrochemical properties correlation of Materials.
- ❖ Fullprof Refinement for structural studies
- ❖ TEM and SEM ,Impedance Data Analysis
- ❖ Synthesis of inorganic Nano materials by Hydrothermal, Microwave synthesis, Sol-gel method, Co-precipitation method.

LEADERSHIP ROLES:

Safety officer, at Center for Automotive Energy Materials (CAEM)-ARCI