

## **Dr. LATHAPRIYA VELLINGIRI**

*PhD in Physics (Research Associate)*

*Expertise in Hydrogen storage & Fuel cells*

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## ***Professional Experience***

### **2022-present Research Associate, CGPL, ICER, Indian Institute of Science (IISc)**

- ✓ Numerical simulation and optimization of biohydrogen fueled SOFC & PEMFC performances under various conditions by COMSOL Multiphysics modelling.
- ✓ Contaminated, degraded or poisoned membrane electrode assembly (MEA) is characterized by using different analytical techniques to enhance fuel cell performance & durability.

### **2015-2022 Doctoral Researcher, SRM Institute of Science and Technology (SRMIST)**

- ✓ High hydrogen storage capacity of 4.0 wt % is achieved in the case of SWCNT-LiBH<sub>4</sub> composites at near ambient conditions.
- ✓ A hydrogen storage capacity of 2.6 wt % is realized by strengthening the surface interaction between SnO<sub>2</sub> and MWCNT.
- ✓ Scientific analysis and writing skills resulted in four (4) publications in peer-reviewed journals, writing funding proposals, and guiding UG and PG project students.

### **2017-2022 Senior Research Fellow, SRM Institute of Science and Technology (SRMIST)**

- ✓ Carbon nanostructure-based composite material properties were analyzed & fine-tuned to attain enhanced hydrogen uptake using analytical and experimental techniques.
- ✓ Got hands-on experience in operating different analytical Instruments like TG-STA 7200 Thermal Analyzer, X-ray Diffractometer, Hydrogen storage setup, Gas sensor setup, etc.
- ✓ **Funding Agency: DST-SERB, Government of India**

### **2015-2017 Junior Research Fellow, SRM Institute of Science and Technology (SRMIST)**

- ✓ Synthesis and Characterization of tin-oxide nanosheets/nanoparticles functionalized MWCNT for hydrogen storage applications.
- ✓ Synthesis and Characterization of tin-oxide nanoparticles functionalized SWCNT or Multi-layered graphene for hydrogen storage applications.
- ✓ **Funding Agency: DST-SERB, Government of India.**

## ***Research Interests***

- Hydrogen Storage
- Material Synthesis and Characterization
- Carbon-based nanomaterials for energy applications
- Fuel cells (Modelling, Testing and Characterization)
- Electrochemistry

## Skills

### Hands-on Experience:

- Materials synthesis → SnO<sub>2</sub>, SnO, CeO<sub>2</sub>, ZrO<sub>2</sub>, ZnO, TiO<sub>2</sub>, Graphene Oxide, g-C<sub>3</sub>N<sub>4</sub>, LiBH<sub>4</sub>,
- Laboratory skills → Wet chemical route, Hydrothermal, Solvothermal, Spin/Dip coating,
- Fabrication technique → Electron beam evaporation, Thermal evaporation and CVD
- Technical skills → TGA, XRD, Hydrogen storage setup, Keithley source meter, Gas-sensor setup

### Characterization Techniques:

- XRD, FTIR, RAMAN, XPS, FESEM, EDAX, TEM, HRTEM-SAED, TGA and Hydrogen adsorption/desorption analysis, Fuel cell testing.

### Softwares:

- Origin, XPS PeakFit, CASA XPS, Image J, Comsol Multiphysics, Python (basics), X'pert Highscore Plus, Fullprof, MS office suite.

## Publications

- [1] **Lathapriya V**, Karthigeyan A, Ramamurthi K, Iyakuuti K. "Synthesis and characterization of MWCNT impregnated with different loadings of SnO<sub>2</sub> nanoparticles for hydrogen storage applications" **International Journal of Hydrogen Energy**, 2018, 43 (2), pp.848-60. **Impact factor- 7.189**
- [2] **Lathapriya V**, Karthigeyan A, Ramamurthi K, Iyakuuti K. "Characterization and hydrogen storage properties of SnO<sub>2</sub> functionalized MWCNT nanocomposites" **International Journal of Hydrogen Energy**, 2018, 43(22) pp.10396-409. **Impact factor-7.189**
- [3] **Lathapriya V**, Karthigeyan A, Ramamurthi K, Iyakuuti K. "Single-walled carbon nanotubes/lithium borohydride composites for hydrogen storage: role of in situ formed LiB(OH)<sub>4</sub>, Li<sub>2</sub>CO<sub>3</sub> and LiBO<sub>2</sub> by oxidation and nitrogen annealing", **RSC Advances**, 2019, 9, pp.31483-31496. **Impact factor-4.08**
- [4] Kaliyaperumal A, **Lathapriya V**, Periyasamy G. *et al.* Improved dehydrogenation properties of surface-oxidized LiBH<sub>4</sub>@NiO nanostructure. **J Mater Sci: Mater Electron**, 2021. **Impact factor- 2.4**
- [5] **Lathapriya V**, Karthigeyan A, Ramamurthi K, Iyakuuti K. "Carbon Nanotubes based hydrogen storage and characterization", **Science and Technological Research Journal**, Volume No. 2, January- February 2018: pp.74-78. (Science Magazine)
- [6] **Lathapriya V**, Karthigeyan A, Ramamurthi K, Iyakuuti K "Borane functionalized multi-walled carbon nanotubes for hydrogen storage applications", In **Proceedings of the seventeenth international conference on thin films: abstracts**. Volume No. 52, 2017

## Ongoing projects

- [1] **Lathapriya V**, Karthigeyan A, **Ramamurthi K**, **Iyakuuti K**, "Hydrogen storage properties of nano-sized SnO<sub>2</sub> particles anchored Multi-layered graphene composites" (**To be communicated**)
- [2] **Lathapriya V**, Karthigeyan A, **Ramamurthi K**, **Iyakuuti K** "Enhanced hydrogen storage of LiBH<sub>4</sub>/Multi-layered graphene composites" (**Working paper**)
- [3] Experimental and Numerical Investigation of biohydrogen Solid-oxide (SOFC) and Polymer electrolyte membrane (PEM) fuel cell for better Performance & Durability (**Ongoing project**)
- [4] Degradation studies of PEM MEA using various analytical techniques (**Ongoing project**)

## Education

2015-2022 **PhD in Physics (Hydrogen Storage)**



- ✓ Thesis: “**Functionalized Carbon nanostructures for Hydrogen Storage Applications.**”
- ✓ Supervisor: Prof. A. Karthigeyan, Department of Physics and Nanotechnology, SRM Institute of Science & Technology (SRM IST), Tamil Nadu, India.

2013-2015 **Master of Science in Physics (CGPA-8.79)**



- ✓ Government Arts College (Autonomous), Bharathiyar University, India
- ✓ Thesis: “Growth and Characterization of Copper doped L-threonine crystals for NLO Applications” (Supervisor: Dr P. Karthigadevi)
- ✓ Thesis: “Construction of Virtual Spectrometer using LabVIEW Software” (Supervisor: Dr Ben Varcoe, University of Leeds, TN Study Abroad Program)

2010-2013 **Bachelor of Science in Physics (CGPA-8.566)**



- ✓ LRG Government Arts College for Women, Bharathiyar University, India
- ✓ University 9<sup>th</sup> Rank Holder

## Awards & Honours

2018 Awarded “**Best Oral Presentation**” in National Conference on Recent trends in Physics of materials-NCRTPM -2018 organized by Pachayappas College, Chennai-600030, Tamil Nadu, India.

2014-2015 I won the prestigious **one-semester Study Abroad program** sponsorship from the Government of Tamil Nadu for pursuing one semester in the **Department of Physics and Astronomy, University of LEEDS**, United Kingdom.

2014-2015 I had a **research experience** in the **Quantum Information Technology lab, University of LEEDS**, England, United Kingdom.

2012-2013 Elected as the Department Secretary for Department of Physics, LRG Government Arts College for Women, Bharathiyar University, India

2008 Awarded “**Children’s Science Academy Award-2008**” for the “Grey Water management in our school” project.

2013 Secured “**University 9<sup>th</sup> Rank**” in BSc Physics from Bharathiyar University

## Declaration

I hereby declare that all the above-furnished details are true to the best of my knowledge and belief.

Place: Tirupur (INDIA)

Dr LATHAPRIYA VELLINGIRI

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*References provided on request.*