CURRICULUM VITAE

Dr S. THIRUMALAIRAJAN

Department of Nanoscience and Technology,
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RESEARCH PROFILE

- Design and development of new techniques for fabrication and characterization, surface modification, and multifunctional application in heterogeneous catalysis, electrochemistry, energy conversion or nanoscale electronic devices, particularly, perovskite, metal oxide and carbon based nanostructured thinfilms and powders.
- Materials development - optimization of processing steps in preparation techniques for suitable applications like photocatalysis, biosensing and gas sensing.
- Morphologically or dimensionally controlled preparation, characterization and application of novel nanomaterials using different physical and chemical methods.
- Development and realization of new high efficiency and low cost transitional metal nanoscale catalysts.
- Monitoring graduate students, managing work force and preparing analytical documents and reports for the funding agencies.

RESEARCH EXPERIENCE

- Department of nanoscience and technology, Bharathiar University, CBE, India

  (Ph.D Research scholar) **01-04-2009 – 10-07-2013**

Ph.D Thesis: Nanostructures and Thinfilms of Perovskite $LaFeO_3$: Morphology Dependent Properties and their Biosensing, Photocatalytic and Gas Sensing Applications

Objective:

- ✓ The aim and scope was to prepare different morphologies of $LaFeO_3$ nanostructures by optimizing the various growth parameters both in chemical and physical processes.
- ✓ Established clear understanding of morphological dependent physical properties such as structural, optical, magnetic and electrical properties. In addition, the different morphologies of $LaFeO_3$ nanostructured powders were analyzed for their technologically significant applications like photocatalysis and biosensing.
- ✓ Further, different morphologies of $LaFeO_3$ nanostructured thin films were prepared by RF sputtering and studied the CO gas sensing.

Dr. N. Ponpandian, Associate Professor

- ❖ Thinfilms and Nanomaterials Lab, Bharathidasan University, Tiruchy, India
  (**Project Asst.**) **01-09-2008 – 31-03-2009**

Project Title: Preparation and Characterization of MnO_2 Thinfilms by Spray pyrolysis

Objective:

- ✓ The aim of project was preparation of MnO_2 thinfilms by spray pyrolysis and some characterization analysis.

Supervisor: Prof. K. Ramamurthi, Professor and Former Head

- ❖ Department of Physics, SRMV CAS, Bharathiar University, Coimbatore, India
  (M.Phil. Research scholar) **01-08-2007 – 31-08-2008**

M.Phil. Thesis: Synthesis, Growth, Physical Chemical Studies of New Semiorganic Nonlinear Optical Crystals – Lithium Thiosemicarbozide Chloride and Lithium Thiourea Chloride

Objective:

- ✓ The aim of project was synthesis, growth, physical and chemical properties of some semi organic nonlinear optical crystal like LTSC and LTC by slow evaporation solution growth.
- ✓ The well grown crystals were characterized using various spectroscopic techniques.
- ✓ Owing to all these properties, LTSC and LTC could be potential candidates for NLO application and device geometry.

Dr. J. Chandrasekaran, Associate Professor

EDUCATION

Ph.D (Nanoscience and Technology), Bharathiar University, India, July 2013. (Highly Commended)

M.Phil. (Physics) Bharathiar University, India, December 2008. (Highly Commended)

M.Sc. (Physics) Bharathiar University, India, May 2007. (Marks: 84.87% - distinction)

B.Sc. (Physics) Bharathiar University, India, April 2004. (Marks: 77.77% - distinction)

OTHER COURSE

Diploma in Computer Application (DCA), Bharathiar University, India, May 2008.

Diploma in Yoga, Bharathiar University, India, April 2007.

HONOURS AND AWARDS

- Jawaharlal Nehru Memorial Fund (JNMF) for Doctoral studies, Government of India
- University Research Fellow (URF), Bharathiar University, Coimbatore, India
- Prof. Raman Award for Best performance in Master Degree
- Certificate of Merit in Bachelor Degree

PUBLICATIONS

- Number of Publications in Refereed Journals : **14**
- Number of Conference Papers and Abstracts : **10**
- Number of Conference Paper Presented by Self : **5**

INTERNATIONAL JOURNAL

1 Novel Synthesis of $LaFeO_3$ Nanostructure Dendrites: A Systematic Investigation of Growth Mechanism, Properties, and Biosensing for Highly Selective Determination of Neurotransmitter Compounds. **S. Thirumalairajan,** K. Girija, V. Ganesh, D. Mangalaraj, C. Viswanathan and N. Ponpandian. ***Crystal Growth and Design (ACS)*** **2013**, *13* (1), 291–302.

2 Shape evolution of perovskite $LaFeO_3$ nanostructures: A systematic investigation on growth mechanism, properties and morphology dependent photocatalytic activities. **S. Thirumalairajan,** K. Girija, Neha Y. Hebalkar, D. Mangalaraj, and N. Ponpandian. ***RSC Advances*** **2013**, 3, 7549-7561

3 Controlled synthesis of perovskite $LaFeO_3$ microsphere composed of nanoparticles via self-assembly process and their associated photocatalytic activity. **S. Thirumalairajan,** K. Girija, I. Ganesh, D. Mangalaraj, C. Viswanathan, A. Balamurugan, and N. Ponpandian. ***Chemical Engineering Journal*** 290 (**2012**) 420-428.

4 Facile synthesis of nanostructures perovskite $LaFeO_3$ flowers by self assembly process and its enhanced electrocatalytic and photocatalytic performance, **S. Thirumalairajan,** et al., **ACS *Applied Materials & Interfaces (Accepted)*** **2013**.

5 Enhanced photocatalytic performance of novel self-assembled floral β-Ga_2O_3 nanorods. K. Girija, **S. Thirumalairajan**, Astam K. Patra, D. Mangalaraj, N. Ponpandian, and C. Viswanathan. ***Current Applied Physics 2013,*** *13 (4), 652-658.*

6 *Organic additive –assisted synthesis of* mesoporous β-Ga2O3 nanostructures for photocatalytic dye degradation. K Girija, **S Thirumalairajan**, Astam K Patra, D Mangalaraj, N Ponpandian and C Viswanathan. **Semiconductor science and Technology** (IOP) **2013,** 28, 035015**.**

7 Synthesis, morphology, optical and photocatalytic performance of nanostructured β-Ga2O3 K Girija, **S Thirumalairajan**, D Mangalaraj and N Ponpandian, **Materials Research Bulletin** (Accepted) 2013.

8 Synthesis, growth, spectral, thermal and photoluminescence properties of a new semiorganic NLO crystal—Thiosemicarbazide lithium chloride [TSLC]. P. Maadeswaran, J. Chandrasekaran and **S. Thirumalairajan *Optik - International Journal for Light and Electron Optics*,** 122 (**2011**) 259-262.

9 Growth and characterization of a new semiorganic nonlinear optical crystal - Bis (thiourea) lithium chloride. P. Maadeswaran, **S. Thirumalairajan**, and J. Chandrasekaran. ***Optik - International Journal for Light and Electron Optics***, 121 (**2010**) 1620-1624.

10 Growth, thermal, optical and birefringence studies of semiorganic nonlinear optical thiosemicarbazide cadmium chloride monohydrate single crystals [TCCM], P. Maadeswaran, **S. Thirumalairajan** and J. Chandrasekaran , ***Optik - International Journal for Light and Electron Optics***, Volume 121, Issue 9, **[2010]**, 773-777.

11 Synthesis, growth, spectral, photoluminescence and VSM properties of a semiorganic nonlinear optical crystal-cadmium thiourea bromide [CTB]. P. Maadeswaran, **S. Thirumalairajan** and J. Chandrasekaran, ***Optoelectronics and Advanced Materials*** - *Rapid Communications,* Vol. 3, No.1, Jan. **[2009]**, p. 36 - 39.

12 Deposition and characterization of Cadmium indium selenide thin film by chemical bath technique. K. Girija**, *S*. Thirumalairajan** and S. M. Mohan, ***Optoelectronics and Advanced Materials - Rapid Communications***, 3, 1 (**2009)** 60 - 62.

13 Structural, morphological and optical studies of CdSe thin films from ammonia bath. K. Girija, ***S*. Thirumalairajan**, S. M. Mohan and J. Chandrasekaran, ***Chalcogenide Letters***, 6,**[2009]** 351-357.

14 Structural and optical investigation of manganese oxide thin films by spray pyrolysis technique, **S. Thirumalairajan**, K. Girija, M. Sudha, P. Maadeswaran and J. Chandrasekaran, ***Optoelectronics and Advanced Materials*** – *Rapid Communications,* Vol. 2, No. 12, Dec.**[2008]**, p.779 - 781.

EXPERIMENTAL TECHNIQUE

- **Nanomaterials synthesis:** Magnetron sputtering deposition (RF/DC), Thermal Evaporation unit, Vapour Phase Transport (VPT) process, Electro deposition, Hydrothermal, Sol-gel, Co-precipitation and Reflux Condensation method etc.,

CHARACTERIZATION TECHNIQUES:

- Structural Analysis: **XRD, Raman and FTIR**
- Morphological Analysis: **SEM, AFM and TEM**
- Thermal Analysis: **TG/DTA and DSC**
- Compositional Analysis: **XPS and EDAX**
- Electrical Analysis: **ac Impedance spectroscopy and dc resistive setup**
- Magnetic Analysis : **VSM**

APPLICATION:

Biosensing behaviour, Photocatalytic activity, Gas sensor measurements and Anitimicrobiological test for prepared nanomaterials

HANDS ON EXPERIENCE

- Magnetron sputtering deposition(RF/DC)
- Thermal Evaporation Unit
- Spray pyrolysis
- Electrochemical work station
- Multiphotoreactor
- FITR and Raman spectroscopy
- Atomic Force microscope
- X-ray diffraction
- Impedance Analyzer
- High-temperature Furnaces
- All kind of vacuum pumps

PERSONAL DATA

Nationality	: **Indian**
Place and date of birth	: Tiruchengode, India, October 8th, 1983.
Permanent address	: 72B, Kattuvalavu, S. NO- 7, Sooriyampalayam (P.O), Tiruchengode, Namakkal - 637 209. India
Language	: English (Fluent), Tamil (Mother Tongue) and Hindi (Speak)

SKILLS

- Strong knowledge and research experience in heterogeneous photocatalysis, electrocatalysis and gas sensor.
- Proficient in preparation, characterization and evaluation of nanoscale materials.
- Strong background in *in-situ* fabrication and characterization of alloy nanoparticles.
- Experience in the preparation of nanomaterials by Physical and chemical methods.
- Good abilities in searching, tidying up and writing literatures for research.
- Excellent abilities in manipulating computers.
- Excellent interpersonal and communication skills.

REFERENCES CONTACT INFORMATION

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I hereby declare that the above written particulars are true, correct to the best of my knowledge and belief. My endeavours shall be dotted with an air of perseverance, hard work and determination.

Place : Coimbatore, India

Yours truly

(S. THIRUMALAIRAJAN)