

DESIGNATION AND CONTACT INFORMATION	Professor Electronic Materials and Thin Films Lab Dept. of Metallurgical and Materials Engineering Indian Institute of Technology, Madras Chennai - 600036, Tamil Nadu, India Office: +91 44 22574756 swamnthn@iitm.ac.in	
EDUCATION	<i>PhD</i> , Materials Science and Engineering University of Illinois at Urbana – Champaign (UIUC) 2003 – 2009 Thesis: “Formation of nanoparticles by thin film dewetting” <i>M.Tech & B.Tech dual degree</i> , Metallurgical and Materials Engineering Indian Institute of Technology, Madras (IITM) 1998 – 2003 Grade Point Average 9.5/10.0	
PROFESSIONAL EXPERIENCE	<i>Editorial Board Member</i> 2023 – present Flexible and Printed Electronics IOP Publishing <i>Professor</i> 2022 – present Dept. of Metallurgical and Materials Engineering IITM <i>Associate Professor</i> 2018 – 2022 Dept. of Metallurgical and Materials Engineering IITM <i>Assistant Professor</i> 2013 – 2018 Dept. of Metallurgical and Materials Engineering IITM <i>Module & Yield Integration Engineer</i> 2011 – 2013 Portland Technology Development (PTD), Intel Corp. Oregon, USA <i>Postdoctoral Research Fellow</i> 2009 – 2011 Materials Science and Engineering, Johns Hopkins University, Baltimore, MD & National Institute of Standards and Technology (NIST), Gaithersburg, MD	
AWARDS	<ul style="list-style-type: none">IIT Madras Best Teacher Award for teaching excellence in Metallurgical and Materials Engineering 2023IIT Madras Young Faculty Recognition Award (YFRA) for excellence in teaching and research 2018Certificate for online course content creation for National Programme on Technology Enhanced Learning (NPTEL) 2014Intel Logic Technology Division (LTD) Award Q1 2013	



- Mavis Memorial Fund scholarship for outstanding engineering graduate students in research and teaching 2006
- Burnett award for best teaching assistant 2005
- Donald W. Hamer fellowship for incoming materials science graduates with best undergraduate academic record 2003
- S. Anatharamakrishnan memorial prize for best undergraduate GPA 2003

TEACHING RE-SPONSIBILITIES *Course instructor* 2013 – present
 Dept. of Metallurgical and Materials Engineering, IITM

1. Phase transformations – undergraduate core course
2. Transport phenomena in materials – undergraduate core course
3. Physics of materials – undergraduate core course
4. Materials characterization – undergraduate core course
5. Environmental degradation of materials – undergraduate core course
6. Electronic materials and devices – graduate elective course
7. Materials and methods in electronic device fabrication – graduate elective course
8. Computational materials engineering lab – undergraduate lab course – one of three lab instructors
9. Materials characterization lab – undergraduate lab course – one of five lab instructors

Online courses 2014 – present

1. NPTEL course: Electronic materials, devices, and fabrication – 40 video lectures, course notes, and assignments developed.
2. Fundamentals of electronic materials and devices - 8 week online course. Since 2016
3. Fundamentals of electronic device fabrication - 4 week online course. Since 2019

Short-term courses

1. Global Initiative of Academic Networks (GIAN) course on **Metal oxide semiconductors: Theory and Applications** with Prof. Celso M. Aldao, Institute of Materials Science and Technology, University of Mar del Plata, Argentina. 1 week course, December 2022.

Teaching Assistant 2005 – 2009

Materials Science and Engineering, UIUC

1. Electronic properties of materials – undergraduate core course
2. Introduction to hard materials – graduate elective

Lab Assistant 2002 – 2003

Materials Characterization Lab

Metallurgical and Materials Engineering, IITM



**INSTITUTE/
DEPARTMENT
SERVICE ROLES**

<i>Current</i>	<ul style="list-style-type: none"> • Co-Advisor, Placement & Internship (P&I), IITM 2024-present
<i>Past</i>	<ul style="list-style-type: none"> • Coordinator, Interdisciplinary Research Program (IDRP) selection committee, IITM 2023-2024 • Faculty advisor, <i>Etch</i> magazine, MME, IITM 2020-2023 • Member, Student Wellness Centre, IITM 2020-2023 • Chairman, Space committee, MME, IITM 2021-2023 • Member, IDRP selection committee, IITM 2021-2023 • Member, Space committee, MME, IITM 2019-2021 • Member, Faculty search committee, MME, IITM 2019-2022 • Member, Board of Academic Courses, IITM 2018-2021 • Member, Timetable Committee, IITM 2018-2021 • Member, Graduate admissions committee, MME, IITM 2013-2018

**RESEARCH
SUPERVISION**

Students	Ongoing	Completed	Total
Post doc	2	1	3
PhD	11	3	14
MS	2	8	10
M. Tech	2	7	9
Dual Degree	0	10	10
B. Tech	1	9	10
Internship, project, & visiting scholars	7	30	37

RESEARCH ID

1. Scopus Author ID: 36110469600
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3. Google Scholar: <https://scholar.google.co.in/citations?user=oZqXwQkAAAAJ>

PATENTS

Granted

1. Sanjeev Patil, Sudha Arumugam, and Parasuraman Swaminathan, “BIS-MUTH FERRITE-BASED FLEXIBLE DEVICE FOR ROOM TEMPERATURE GAS SENSING”, Indian Patent No. 549328.
2. Swati Suman and Parasuraman Swaminathan, “SYSTEM FOR OPTOELECTRONIC CHARACTERIZATION OF SOLID-STATE PHOTODETECTORS”, Indian Patent No. 548386.
3. Balamurugan L and Parasuraman Swaminathan, “MICRONEEDLE ARRAY DEVICE AND METHOD THEREOF”, Indian Patent No. 540518.
4. L. Balamurugan and Parasuraman Swaminathan, “SYSTEM AND METHOD TO FORM CONTINUOUS GLUCOSE MONITORING DEVICE”, Indian Patent No. 537167.
5. Nitheesh M. Nair, Debducta Ray, and Parasuraman Swaminathan, “SINGLE LAYER FLEXIBLE DISPLAY AND METHOD OF MANUFACTURING THE SAME”, Indian Patent No. 435167.



6. Nitheesh M. Nair, Debdutta Ray, and Parasuraman Swaminathan, "A PRINTABLE TRANSPARENT WI-FI ANTENNA", Indian Patent No. 428191.
7. Manasa Hari Adavalli, Lakshman Neelakantan, and Parasuraman Swaminathan, "AAO TEMPLATE-ASSISTED SYNTHESIS PROCESS COUPLED WITH ALKALI ETCHING TO DEVELOP ZINC OXIDE BRANCHED SUPERSTRUCTURES", Indian Patent No. 421576.
8. Nitheesh M. Nair, Debdutta Ray, and Parasuraman Swaminathan, "A CONDUCTING ELECTROCHROMIC COMPOSITE OF METALLIC NANOWIRES AND MULTI-COLOURED THERMOCHROMIC MATERIALS", Indian Patent No. 401967.
9. Arulkumar Ganapathi, Parasuraman Swaminathan, and Lakshman Neelakantan, "A METHOD FOR FABRICATION OF METALLIC NANOWIRES BY GALVANIC DISPLACEMENT REACTION USING AAO TEMPLATES", Indian Patent No. 373659.

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1. Swati Suman and Parasuraman Swaminathan, "A NARROWBAND PRINTED FLEXIBLE HYBRID PHOTODETECTOR AND A METHOD OF FABRICATION THEREOF", Indian Patent, Application No. 202441087736, Filed on 13/11/2024.
2. Nikhila Patil, Sowmya Venkatesh, Parasuraman Swaminathan, and Sumathi Parasuraman, "A PRINTED PATTERNS OF THIN FILM HEATERS ON A QUARTZ SUBSTRATE USING SILVER NANOPARTICLE INK AND ITS METHOD OF PRINTING", Indian Patent, Application No. 202411065129, Filed on 28/08/2024.
3. Ranjithvel M, Sudha A, and Parasuraman Swaminathan, "ELECTROCHROMIC DEVICE BASED ON VANADIUM OXIDE ACTIVE ELECTRODE AND SALT-BASED ELECTROLYTE", Indian Patent, Application No. 202441060769, Filed on 12/08/2024.
4. Abishek Kumar, Neethu Thomas, and Parasuraman Swaminathan, "PROCESS FOR PRODUCING FLEXIBLE SURFACE ENHANCED RAMAN SPECTROSCOPY (SERS) SUBSTRATES, SUBSTRATES THEREOF AND THEIR APPLICATIONS", Indian Patent, Application No. 202441041004, Filed on 27/05/2024.
5. Abishek Kumar, Neethu Thomas, and Parasuraman Swaminathan, "NANOPATTERNING POLYMER SURFACE USING OXYGEN PLASMA", Indian Patent, Application No. 202341079046, Filed on 21/11/2023.
6. Prabhu, Gayathri, Robin C Jayaram, Naveinah C, Parasuraman Swaminathan, and Aarju Mathew Koshy, "HEATABLE GLAZING", Indian Patent, Application no. 202341065177, Filed on 22/09/2023. Applicants: Saint-Gobain Glass France and Indian Institute of Technology-Madras.
7. Arunvel Thangamani, Parasuraman S, Balamurugan TS, and Naveinah Chandrasekaran, "A PRINTED ELECTRONIC STACK EMBEDDED IN A VEHICLE GLAZING", Indian Patent, Application no. 202141017597, Filed on 15/04/2021. Applicants: Saint-Gobain Glass France and Indian Institute of Technology-Madras.

BOOKS

1. "Semiconductor materials, devices, and fabrication", Parasuraman Swaminathan, Wiley India, ISBN 13: 9788126566594, 2017



1. Nikhila Patil, Sowmya Venkatesh, Parasuraman Swaminathan, and P. Sumathi, “Design Evaluation and Performance Analysis of Silver Nanoparticle Ink-Based Printed Heaters”, *Flex. Print. Electron.* *in press* (2024).
2. Neha Thakur, Sudha Arumugam, Neethu Thomas, Aarju Mathew Koshy, Parasuraman Swaminathan, and Hari Murthy, “Direct Ink Writing of Nickel oxide-based Thin Films for Room Temperature Gas Detection”, *Journal of Semiconductors (IOP)*, *in press* (2024).
3. Kokkiligadda Jhansi and Parasuraman Swaminathan, “Photocatalytic Dye Degradation with Magnetically Recoverable and Reusable Bismuth Ferrite Nanoparticles”, *J. Electron. Mater.* *in press* (2024). DOI: 10.1007/s11664-024-11574-z
4. Kokkiligadda Jhansi and Parasuraman Swaminathan, “Role of Chelating Agents on the Sol-Gel Synthesis of Bismuth Ferrite Nanoparticles”, *J. Sol-Gel Sci. Technol.* **112**, 846 (2024).
5. Neha Sharma, Ganapathi Rao Kandregula, Aarju Mathew Koshy, Kothandaraman Ramanujam, Debduitta Ray, and Parasuraman Swaminathan, Water-based activated carbon ink for printed flexible biodegradable supercapacitors, *Adv. Sustainable Syst.* **2024**, 2400649 (2024).
6. Neha Thakur, Parasuraman Swaminathan, and Hari Murthy, “Mathematical model of nickel-graphene composite inks for jetting properties in inkjet printing”, *Malaysian J. Sci.* **43**, 59 (2024).
7. Neethu Thomas, Bharathkumar S, Aarju Mathew Koshy, Madivala G. Basavaraj, and Parasuraman Swaminathan, “Investigating the optical and electrical performance of rod coated silver nanowire-based transparent conducting films”, *IOP Nanotechnology* **35**, 465602 (2024).
8. Rajarshi Chakraborty, Subarna Pramanik, Nila Pal, Utkarsh Pandey, Swati Suman, Parasuraman Swaminathan, and Bhola Nath Pal, “Emulating low-power synaptic plasticity in a solution-processed oxide-based long retention memory transistor with high learning accuracy”, *ACS Appl. Mater. Interfaces* **16**, 47820 (2024).
9. Sobhan Hazra, Sandeep Dahiya, Satya Veer Singh, Utkarsh Pandey, Swati Suman, Parasuraman Swaminathan, Bhola Nath Pal, “Flexible transparent conductors with a percolated Ag nanostructure and its application as efficient self-bias plasmonic photodetector”, *Chem. Engg. J.* **498**, 155313 (2024).
10. Meenu Maria Solly, Neha Sharma, Aarju Mathew Koshy, Faiz Ali, Sudha Arumugam, and Parasuraman Swaminathan, “Effect of annealing temperature on the electrochromic properties of electrochemically oxidised nickel”, *J. Electron. Mater.* **53**, 6348 (2024).
11. Sanjeev Patil, Sudha Arumugam, and Parasuraman Swaminathan, “Bismuth ferrite-silver nanowire flexible nanocomposites for room temperature nitrogen dioxide sensing”, *ACS Omega* **9**, 28978 (2024).
12. Uday Kumar, Hitensinh B. Vaghela, Aarju Mathew Koshy, and Parasuraman Swaminathan, “Low emissivity thin film coating on Glass Fiber Reinforced Plastic used for cryogenic applications”, *J. Mater. Sci. Mater. Electron.* **35**, 474 (2024).
13. Neha Thakur, Neethu Thomas, Aarju Mathew Koshy, Parasuraman Swaminathan, and Hari Murthy, “Formulation of Nickel oxide-Graphene composite ink and the fabrication of thin film electrodes using Direct Ink Writing”, *J. Electron. Mater.* **53**, 2573 (2024).



14. A. Sudha, Mahaboob Jahanara Mohammad, Meenu Maria Solly, and Parasuraman Swaminathan, “Nickel tungstate derived from WO_3 and NiO for room temperature CO_2 sensing”, *Appl. Phys. A*, **130**, 84 (2024).
15. Neha Sharma, Aarju Koshy, Ganapathi Rao Kanregula, Kothandaraman Ramanujam, Debdutta Ray, and Parasuraman Swaminathan, “Printed silver nanowire-PEDOT:PSS composite electrodes for flexible transparent micro-supercapacitor applications”, *ACS Appl. Energy Matls.* **7**, 363 (2024).
16. Swati Suman, Utkarsh Pandey, Nila Pal, Parasuraman Swaminathan, and Bhola Pal, “Narrow-band red-sensitive positive- negative reversible photodetector using organic dye on $\text{TiO}_2/\text{SnO}_2$ heterojunction”, *ACS Photonics*, **11**, 93 (2024).
17. A. Sudha, Allamula Ashok, Sanjeev Patil, Satyesh Kumar Yadav, and P. Swaminathan, “Improving the photoresponse of magnetron sputtered titania films by optimising substrate and electrode configuration”, *Solar Energy*, **266**, 112163 (2023).
18. Neethu Thomas, Neha Sharma, and Parasuraman Swaminathan, “Optimizing silver nanowire dimensions by the modification of polyol synthesis for the fabrication of transparent conducting films ”, *Nanotechnology* **35**, 055602 (2023).
19. Garikapati Nagasarvari, Nitheesh M. Nair, Shyama D. Ranade, Lakshman Neelakantan, and Parasuraman Swaminathan, “PDMS-metal oxide nanocomposites as transparent encapsulants for flexible electronic devices”, *Flex. Print. Electron.* **8**, 045004 (2023).
20. Meghna Narayanan, Aarju Mathew Koshy, and P. Swaminathan, “Direct writing of reactive inks based on electroless nickel deposition on pure aluminium powders”, *J. of Materi. Eng. and Perform. in press* (2023). DOI: 10.1007/s11665-023-08849-7
21. Sundar Sudharsan, Rajendran Rajaram, Sachin Kumar, Parasuraman Swaminathan, Kothandaraman Ramanujam, and Lakshman Neelakantan, “Copper oxide anchored polyaniline modified glassy carbon electrode: A new sensor platform for the Amperometric determination of Chlorpyrifos.”, *Electrochimica Acta* **471**, 143305 (2023).
22. Swati Suman, Sandeep Dahiya, Ravi Jaiswal, Parasuraman Swaminathan, and Bhola Pal, “Fabrication of red sensitive heterojunction photodetector by using a narrowband organic dye”, *J. Phys. Chem. C* **127**, 19182 (2023).
23. Mahaboob Jahanara Mohammad, A. Sudha, Manasa Hari Adavali, and Parasuraman Swaminathan, “Room temperature chemiresistive sensing of carbon dioxide using a composite of zinc oxide and nickel oxide”, *Surfaces and Interfaces* **41**, 103155 (2023).
24. Allamula Ashok, Vir Karan, Peela Lasya, Daljin Jacob, Parasuraman Swaminathan, and Satyesh Kumar Yadav, “Optimization of the deposition process parameters of DC magnetron sputtering to achieve desired deposition rate using design of experiment method”, *J. Electron. Mater.* **52**, 6851 (2023).
25. Darbha V Ravi Kumar, Aarju Mathew Koshy, Neha Sharma, Neethu Thomas, and P. Swaminathan, “Room temperature curable copper nanowire-based transparent heater”, *ACS Omega* **8**, 21107 (2023).
26. Rajarshi Chakraborty, Nila Pal, Utkarsh Pandey, Subarna Pramanik, Srishti Paliwal, Swati Suman, Akanksha Gupta, Akhilesh Kumar Singh, Parasuraman



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- Swaminathan, Pradip Kumar Roy, Bhola Nath Pal, "Fabrication of non-volatile memory transistor by charge compensation of interfacial ionic polarization of a ferroelectric gate dielectric", *Appl. Matls. Today* **33**, 101862 (2023).
27. Nila Pal, Rajarshi Chakraborty, Anand Sharma, Utkarsh Pandey, Vishwas Acharya, Krishna Prajapati, Akanksha Gupta, Swati Suman, Parasuraman Swaminathan, Akhilesh Kumar Singh, Pradip Kumar Roy, and Bhola Nath Pal, "Solution Processed Li-Al₂O₃/LiNbO₃/Li-Al₂O₃ Stacked Gate Dielectric for a Non-volatile Ferroelectric Thin Film Transistor", *J. Alloys Compd.* **960**, 170691 (2023).
 28. Kokkiligadda Jhansi, Neethu Thomas, Lakshman Neelakantan, and P. Swaminathan, "Controlling the aspect ratio of silver nanowires in the modified polyol process", *Materials Letters*, **344**, 134396 (2023).
 29. Sanjeev Patil and P. Swaminathan, "Precursor-based bismuth ferrite ink for direct writing", *Materials Letters*, **343**, 134390 (2023).
 30. Meenu M. Solly, Neha Sharma, and P. Swaminathan, "A transparent photodetector based on a composite of silver and tungsten oxide nanowires", *IEEE Journal on Flexible Electronics*, **2**, 421 (2023). Part of special issue on "Flexible electronics for emerging markets and developing economies".
 31. T. Bhargavi, N.M. Nair, A. Belavadi, and P. Swaminathan, "Fabrication of a printed heater using a composite of silver nanowires and neutral PEDOT:PSS", *IEEE Journal on Flexible Electronics*, **2**, 395 (2023). Part of special issue on "Flexible electronics for emerging markets and developing economies".
 32. A.M. Koshy, A. Sudha, S.K. Yadav, and P. Swaminathan, "Effect of substrate temperature on the optical properties of DC magnetron sputtered copper oxide thin films", *Physica B: Physics of Condensed Matter*, **650**, 414452 (2023).
 33. Faiz Ali, Lakshman Neelakantan, and P. Swaminathan, "Electrochromic displays via room temperature electrochemical oxidation of nickel", *ACS Omega*, **7**, 39090 (2022).
 34. Neethu Thomas, Pamula Sreekeerthi, and P. Swaminathan, "Combined experimental and simulation study of self-assembly of colloidal gold nanoparticles on silanized glass", *Physical Chemistry Chemical Physics*, **24**, 25025 (2022).
 35. A.M. Koshy, A. Sudha, P. Gollapalli, S.K. Yadav, and P. Swaminathan, "Annealing-induced changes in optoelectronic properties of sputtered copper oxide films", *J. Mater. Sci.: Mater. Electron*, **33**, 13539 (2022).
 36. A. Sudha, A.M. Koshy, and P. Swaminathan, "Microstructure tailoring of tungsten oxide for enhanced properties by varying sintering temperatures", *Materials Letters*, **316**, 132007 (2022).
 37. Mahaboob Jahanara Mohammad, Hari Ramachandran, and P. Swaminathan, "Non-linear electrical behaviour of ZnO-NiO composites prepared by solid-state synthesis", *Journal of Electronic Materials*, **51**, 2298 (2022)
 38. Neha Sharma, Nitheesh M. Nair, Garikapati Nagasarvari, Debdutta Ray, and P. Swaminathan, "A review of silver nanowire-based composites for flexible electronic applications", *Flexible and Printed Electronics*, **7**, 014009 (2022)
 39. Nitheesh M. Nair, Mohammad Mahaboob Jahanara, Debdutta Ray, and P. Swaminathan, "Photoresponse of a printed transparent silver nanowire-zinc oxide nanocomposite", *Flexible and Printed Electronics*, **6**, 045004 (2021).



40. Nitheesh M. Nair, Ishani Khanra, Debdutta Ray, and P. Swaminathan, "Silver nanowire-based printable electro-thermo-chromic ink for flexible touch-display applications", *ACS Applied Materials and Interfaces*, **13**, 34550 (2021).
41. Sonia Sharma, Meghna Narayanan, Ravi Gautham, Raghavan Gopalan, and P. Swaminathan, "Effect of processing route on the structural and functional properties of manganese doped zinc oxide", *Matls. Chem. Phys.* **261**, 124206 (2021).
42. Meghna Narayanan, Allakonda Harsha, Anirban Chakraborty, and P. Swaminathan, "Reactive bilayers by self-activated electroless nickel-phosphorous deposition on pure aluminum", *JOM* **73**, 574 (2021).
43. Krishna Kumar, Mrudula Kavuri, and P. Swaminathan, "Effect of nanoparticles on the dewetting of bismuth films", *Surface Engineering* **37**, 406 (2021).
44. Nitheesh M. Nair, Jayaram Kizhekke Pakkathillam, Krishna Kumar, Kavitha Arunachalam, Debdutta Ray, and P. Swaminathan, "A printable silver nanowire and PEDOT:PSS nanocomposite ink for flexible transparent conducting applications", *ACS Applied Electronic Matls.* **2**, 1000 (2020).
45. Hari Ramachandran, Mohammad Mahaboob Jahanara, Nitheesh M. Nair, and P. Swaminathan, "Metal oxide heterojunctions using a printable nickel oxide ink", *RSC Advances*, **10**, 3951 (2020).
46. Nitheesh M. Nair, Kevin Daniel, Sai Chandrahaas Vadali, Debdutta Ray, and P. Swaminathan, "Direct writing of silver nanowire-based ink for flexible transparent capacitive touch pad", *Flexible and Printed Electronics*, **4**, 045001 (2019).
47. Arulkumar Ganapathi, P. Swaminathan, and Lakshman Neelakantan, "Anodic Aluminum Oxide Template Assisted Synthesis of Copper Nanowires using Galvanic Displacement Process for Electrochemical Denitrification", *ACS Applied Nano Materials*, **2**, 5981 (2019)
48. Anirban Chakraborty, Nitheesh M. Nair, Anjali Adekar, and P. Swaminathan, "Templated electroless nickel deposition for patterning applications", *Surface and Coatings Tech.* **370**, 106 (2019)
49. Krishna Kumar and P. Swaminathan, "Fabrication of silica nanopillars by templated etching using bimetallic nanoparticles for anti-reflection applications", *Appl. Surf. Sci.* **456**, 915 (2018)
50. K.S. Suganthi, K. Harish, Nitheesh M. Nair, and P. Swaminathan, "Formulation and optimization of a zinc oxide nanoparticle ink for printed electronics applications", *Flex. Print. Electron.* **3**, 015001 (2018)
51. Krishna Kumar and P. Swaminathan, "Role of silver nanoparticles in the dewetting behavior of copper thin films", *Thin Solid Films* **642**, 364 (2017)
52. Sonia Sharma, Sumukh S. Pande, and P. Swaminathan, "Top-down synthesis of zinc oxide based inks for inkjet printing", *RSC Advances* **7**, 39411 (2017)
53. Sonia Sharma, Raghavendar Bayikadi, and P. Swaminathan, "Spark plasma sintering route to synthesize aluminium doped zinc oxide", *RSC Advances* **6**, 86586 (2016)
54. Sonia Sharma, Pranith Ramesh, and P. Swaminathan, "Reduction in band gap of Manganese doped Zinc Oxide: Role of oxidation state", *J. Elec. Mater.* **44**, 4710 (2015)



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59. P. Swaminathan, S. Sivaramakrishnan, J.S. Palmer, and J.H. Weaver, “Size dependence of nanoparticle dissolution in a matrix: Gold in bismuth”, *Phys. Rev. B* **79**, 144113 (2009)
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61. J.S. Palmer, P. Swaminathan, S. Babar, and J.H. Weaver, “Solid state dewetting-mediated aggregation of nanoparticles”, *Phys. Rev. B* **77**, 195422 (2008) (Editor suggested paper)
62. W. Chern, J.S. Palmer, P. Swaminathan, and J.H. Weaver, “Nanoparticle aggregation due to dewetting of sandwiched buffer layers”, *Surf. Sci.* **602**, 2816 (2008)
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65. P. Swaminathan, V.N. Antonov, J.A.N.T. Soares, J.S. Palmer, and J.H. Weaver, “Cd-based II-VI semiconductor nanostructures produced by buffer-layer-assisted growth: Structural evolution and photoluminescence”, *Phys. Rev. B* **73**, 125430 (2006)
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**CONFERENCE
PROCEEDINGS**

1. Swati Suman, P. Swaminathan, and Bhola Nath Pal, “Organic Dye Based Longer Wavelength Photodetector for Narrowband Application”, 2022 IEEE International Conference on Emerging Electronics (ICEE), Bangalore, India, 2022, pp. 1-4, DOI: 10.1109/ICEE56203.2022.10117952
2. S. Arumugam, A. M. Koshy, F. Ali, M. M. Solly, and P. Swaminathan, “Magnetron sputtered tungsten oxide films for electrochromic applications”, 2022



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3. Pamula Sreekeerthi, Nitheesh M. Nair, Garikapati Nagasarvari, and P. Swaminathan, “Planar capacitive touch sensors - A comparative study”, *Sensing Technology. Lecture Notes in Electrical Engineering*, **886**. pp 231-245, Springer, Cham, 2022. Online ISBN: 978-3-030-98886-9
 4. Jayaram Kizhekke Pakkathillam, Nitheesh M. Nair, P. Swaminathan, and Kavitha Arunachalam, “Planar Printed E-Field Sensor Array for Microwave NDE of Composites”, *Advances in Non-destructive Evaluation*, Springer Singapore, pp. 219-228, ISBN: 978-981-16-0185-9, 2021
 5. N. M. Nair, D. Ray and P. Swaminathan, “Simulation assisted flexibility improvement studies for flexible transparent printed touch sensors”, 2020 5th IEEE International Conference on Emerging Electronics (ICEE), New Delhi, India, 2020, pp. 1-4, DOI: 10.1109/ICEE50728.2020.9777066
 6. Jayaram Kizhekke Pakkathillam, Balamurugan T. Sivaprakasam, Jayaprakash Poojali, Nitheesh M. Nair, P. Swaminathan, C. V. Krishnamurthy, and Kavitha Arunachalam, “Focal Plane Characterization of Spot Focusing Horn Antennas for Free Space Microwave Dielectric NDE”, *Electromagnetic Nondestructive Evaluation XXII*, IOS Press, pp. 74-79, ISBN: 978-1-64368-041-5, 2019

PREPRINTS

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2. Neethu Thomas and P. Swaminathan, “Transmittance modulation by gold nanoparticle mediated wet chemical etching of silica”, ChemRxiv, 10.26434/chemrxiv-2023-m6279
3. Aarju Mathew Koshy, A. Sudha, Satyesh Kumar Yadav, P. Swaminathan, “Effect of substrate temperature on the optoelectronic properties of DC magnetron sputtered copper oxide films”, arXiv:2205.05615 [cond-mat.mtrl-sci]
4. Nitheesh M. Nair, Debducta Ray, P. Swaminathan, “Paper-based printed CPW-fed antenna for Wi-Fi applications”, arXiv: 2202.03266[ees.SP]
5. K.R. Kumaresh, Lakshman Neelakantan, P. Swaminathan, “Template-assisted growth of silver nanowires by electrodeposition”, arXiv:2201.04947 [cond-mat.mtrl-sci]
6. P. Swaminathan, “Monte Carlo simulations as a route to compute probabilities”, arXiv:2108.00851 [physics.ed-ph]

INVITED TALKS

1. “Optoelectronic properties and applications of metal oxides”, Faculty Development Program on Advances in Semiconductor and Photonic Devices, Vasavi College of Engineering, Hyderabad. Telangana, August 2024
2. “Printed Electronics”, INUP Familiarization workshop, Centre for NEMS and Nanophotonics (CNNP), IIT Madras, July 2024
3. “Printed electronics”, Sri Venkateswara College of Engineering, Summer Internship 2024: Semiconductor Technology, June 2024
4. “Printed electronics: From fundamentals to applications”, Quanta 2024, Society of Materials Science Engineers (SMSE) at College of Engineering Guindy, Anna University, Chennai, May 2024



5. “Metal oxide semiconductors: Theory and Applications”, Faculty Development Program, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai, December 2023
6. “Functional applications of silver nanowire-based composites”, Dept. of Chemistry, B.M.S College of Engineering, Bangalore, Dec 2023
7. “Synthesis of transparent conducting films and their engineering applications”, Workshop on Antenna Design Technologies for Intelligent Transport System, Anna University, September 2023
8. “Printed Electronics”, INUP Familiarization workshop, Centre for NEMS and Nanophotonics (CNNP), IIT Madras, June 2023
9. “Silver nanowires: What are they good for? Absolutely ‘everything’!”, SCDT-FlexE Centre Webinar, March 2023. Available in [YouTube](#).
10. “Direct writing of nanostructures for optoelectronic applications”, International Conference on Advanced Ceramic Technologies for Futuristic Mobility, IIT Madras, March 2023.
11. “Printed Electronics: From Fundamentals to Applications”, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai, February 2023
12. “Development of passive matrix displays based on thermo- and electrochromic materials”, 6th International Conference on Emerging Electronics (IEEE-ICEE), Bangalore, December 2022.
13. “Silver nanowire-based printed flexible transparent electronic devices”, University of Nantes, November 2022.
14. “Printed electronics: An emphasis on research perspective”, VIT-Vellore (School of Electronics Engineering), October 2022.
15. “Direct writing of nanostructures for flexible optoelectronic applications”, 12th Indo-German Frontiers of Engineering Symposium (INDOGFOE), Bremen, Germany, September 2022.
16. “Challenges and future outlook of IC fabrication”, R.M.D Engineering College, May 2022
17. “Direct writing of optoelectronic devices for automotive applications”, Saint-Gobain Technical Symposium University Collaboration, IITM Research Park, April 2022
18. “Materials for flexible electrodes and displays”, AICTE Sponsored QIP short term course on Frontiers in materials research: from materials simulation to emerging applications, IIITDM Kancheepuram, March 2022
19. “Printed Electronics”, 1st INUP Familiarization workshop, Centre for NEMS and Nanophotonics (CNNP), IIT Madras, January 2022
20. “Review of electrical conductivity in metals”, UGC HRDC XIII Refresher Course in Physics, University of Madras, November 2021
21. “Silver nanowire-based printed transparent touch sensors”, 5th International Conference on Emerging Electronics (IEEE-ICEE 2020), IIT Delhi, November 2020
22. *Panelist*, “Flexible, printable, wearable electronics, and additive manufacturing” part of Electronics and Semiconductors Technologies (EST) vertical, Vaishvik Bhartiya Vaigyanik (Vaibhav) Summit, October 2020



23. “One-dimensional nanostructures: synthesis, properties, and applications”, Faculty Development Program on Fabrication of Electronic Devices using Nanomaterials, JSS Science and Technology University, August 2020
24. “Semiconductor Physics”, Summer Training Program in Physics (STPIP–2020), University of Madras, July 2020
25. “Free Electron Theory”, Summer Training Program in Physics (STPIP–2020), University of Madras, July 2020
26. “Transparent flexible printed electronic devices for automotive applications”, Saint-Gobain Technical Symposium University Collaboration, IITM Research Park, March 2020
27. “Internet of Things (IoT): Materials for Industry 4.0”, Amrita Vishwa Vidyapeetham Chennai Campus, Science Day function, February 2020
28. “Silver nanowire-based nanocomposites for flexible transparent heaters”, 26th International Symposium on Metastable, Amorphous and Nanostructured Materials (ISMANAM 2019), Chennai, July 2019
29. “Nano electronic materials”, IIT Madras Workshop on Advances in Nanotechnology, December 2018
30. “Metallic nanowire composites for flexible electronics applications”, 4th International Conference on Emerging Electronics (ICEE) 2018, Bangalore, December 2018
31. “Printed Oxide Electronics: A summary of our efforts at IIT Madras”, NIT Rourkela, Nov 2017
32. “Printed Electronics”, NIT-Mettla 2017 (MME department technical festival), NIT-Trichy, March 2017
33. “Challenges in electronic device fabrication”, VIT (School of Electronics Engineering), VIT-Vellore, February 2017
34. “Optical surface characterization techniques”, Bruker pre-conference workshop as part of ISRS, IIT Madras, Dec 2016
35. “MEMS based high temperature nanocalorimetry”, International Conference on MEMS and Sensors (ICMEMSS-2014), IIT Madras, Dec 2014
36. “Electronic materials – basics, properties & applications”, Indian Institute of Information Technology Design & Manufacturing (IIITDM), IIITDM, Kancheepuram, Oct 2014
37. “Nanocalorimetry: Measurements of enthalpies in thin films”, IIM Chennai-Kalpakkam Inter Chapter meeting, IGCAR Kalpakkam, Mar 2014

CONFERENCE PRESENTATIONS

1. Neha Sharma, Debdutta Ray, and Parasuraman Swaminathan, “Ti₃C₂T_x & silver nanowires-based printed transparent flexible micro-supercapacitor”, 6th IEEE International Flexible Electronics Technology Conference (IFETC 2024), Bologna, Italy, September 2024
2. A. M. Koshy, N. Sharma, K.V. Raman, and Parasuraman Swaminathan, “Silver nanowire - sodium carboxymethylcellulose composite ink for sustainable fabrication of highly transparent and flexible electronic devices”, IFETC 2024, Bologna, Italy, September 2024



3. Anupama Behera, Neha Sharma, and Parasuraman Swaminathan, “Electrochromic behaviour of nickel oxide thin films grown by DC magnetron sputtering”, International Conference on Energy and Environmental Materials (E2M-2024), IIT Indore, July 2024 (**best poster award** in Theme A/ Synthesis & Characterization of Energy Materials)
4. Swati Suman, Anupama Behera, and Parasuraman Swaminathan, “Fabrication of Broadband UV MSM Photodetector Using Reactive Sputtered Nickel Oxide Film”, Materials Research Society (MRS) Spring Meeting & Exhibit, Seattle, Washington, USA, April 2024
5. Neha Sharma, Debducta Ray, and Parasuraman Swaminathan, “Water-based activated carbon ink for flexible biodegradable supercapacitors”, International Conference on Sustainable Nanomaterials Integration & Organization for Energy and Environment (ISNIOE²) 2024, Shiv Nadar Institution of Eminence (SNIoE) Deemed to be University, Delhi NCR, March 2024 (**best presentation in Environmental Sustainability**)
6. Aarju Mathew Koshy and P. Swaminathan, “Sustainable 3D printing of transparent flexible electronic devices using eco-friendly silver nanowire-cellulose composite ink”, AMALGAM 2024 (Materials Festival), Annual Technical Event, Department of Metallurgical and Materials Engineering, IIT Madras, Chennai, March 2024 (**best oral presentation award**)
7. Neethu Thomas, Bharathkumar S, and Parasuraman Swaminathan, “Tailoring the dimensions of silver nanowires (Ag NW) by modifying the polyol synthesis and the fabrication of Ag NW-based transparent conducting films (TCFs)”, Complex Fluids (CompFlu 23) Conference, IIT Madras, Dec 2023
8. Sanjeev Patil, Sudha Arumugam, and Parasuraman Swaminathan, “Bismuth ferrite based flexible composites for room temperature nitrogen oxide sensing”, XXII International Workshop on Physics of Semiconductor Devices (IWPSD 2023), IIT Madras, Dec 2023
9. A.Sudha, Allamula Ashok, Sanjeev Patil, Satyesh Kumar Yadav, and Parasuraman Swaminathan, “Photoresponse of reactive magnetron sputtered titania films on p-type silicon substrates”, IWPSD 2023, IIT Madras, Dec 2023
10. Ranjithvel M, A. Sudha, Allamula Ashok, Satyesh Kumar Yadav, and Parasuraman Swaminathan, “Magnetron sputtered vanadium oxide for electrochromic applications”, IWPSD 2023, IIT Madras, Dec 2023
11. Neha Sharma, Meenu Maria Solly, Neethu Thomas, and Parasuraman Swaminathan, “Ag NW-based composite for flexible and transparent room temperature gas sensors”, IWPSD 2023, IIT Madras, Dec 2023
12. Bharathkumar S, Neethu Thomas, and Parasuraman Swaminathan, “Fabricating silver nanowire-based transparent conductive films: Investigating the impact of nanowire dimensions and optimizing the rod coating parameters”, IWPSD 2023, IIT Madras, Dec 2023
13. Neethu Thomas, Neha Sharma, and Parasuraman Swaminathan, “Effect of silver nanowire dimensions on its optoelectronic properties: A combined experimental and theoretical investigation”, IWPSD 2023, IIT Madras, Dec 2023
14. Swati Suman and Parasuraman Swaminathan, “Enhancement of photo response by using an organic molecule on metal oxide and silver nanowires”,



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- International Conference on Optoelectronic and Bio Inspired Nanomaterials (ICOBIN 2023), IIT Roorkee, Dec 2023
15. Abishek Kumar, Neethu Thomas, and P. Swaminathan, “Diverse patterns of polydimethylsiloxane (pdms) using maskless reactive ion etching”, 8th International Conference on Advanced Nanomaterials and Nanotechnology (ICANN 2023), IIT Guwahati, Dec 2023
 16. Meenu Maria Solly, Faiz Ali, and P. Swaminathan, “Effect of annealing temperature on electrochemically oxidised nickel for electrochromic application”, International Conference on Thin Films & Nanotechnology: Knowledge, Leadership, & Commercialization (ICTN-KLC), IIT Madras, July 2023
 17. Uday Kumar, Hitensinh B. Vaghela, Aarju Mathew Koshy, and P. Swaminathan, “Low emissivity thin film coating on Glass Fiber Reinforced Plastic (GFRP) used for cryogenic applications”, ICTN-KLN, IIT Madras, July 2023
 18. Neha Thakur, Neethu Thomas, Aarju Mathew Koshy, P. Swaminathan, and Hari Murthy, “NiO- Graphene thin films by inkjet printing for sensing applications”, ICTN-KLN, IIT Madras, July 2023
 19. Sanjeev Patil, Sudha Arumugam, Neethu Thomas, and P. Swaminathan, “Gas sensing of BFO-Ag nanocomposite devices”, 11th International Conference on Materials for Advanced Technologies (ICMAT), Singapore, June 2023
 20. Neha Sharma, Ganapathi R. Kandregula, Aarju M. Koshy, Kothandaraman Ramanujan, Debdutta Ray, and P. Swaminathan, “Printed activated carbon-based flexible micro-Supercapacitors”, ICMAT, Singapore 2023
 21. Sanjeev Patil, Neethu Thomas, and P. Swaminathan, “Photodetection and solar-assisted sensing of BFO-Ag nanocomposite devices”, ICMAT, Singapore, June 2023
 22. Aarju Mathew Koshy, Darbha V Ravi Kumar, Neha Sharma, Neethu Thomas, and P. Swaminathan, “Room temperature curable copper nanowire-based transparent heater”, AMALGAM 2023 (Material Festival), Annual Technical Event, Department of Metallurgical and Materials Engineering, IIT Madras, Chennai, April 2023 (**best oral presentation award**)
 23. Swati Suman, Bholu N. Pal, and P. Swaminathan, “Metal-Oxide based Inorganic-Organic Hybrid Photodetector for Narrowband Application”, AMALGAM 2023 (Material Festival), Annual Technical Event, Department of Metallurgical and Materials Engineering, IIT Madras, Chennai, April 2023
 24. Neha Sharma, Aarju Mathew Koshy, Ganapathi Rao Kandregula, Kothandaraman Ramanujan, Debdutta Ray, and P. Swaminathan, “Direct writing of silver nanowire and PEDOT:PSS nanocomposite ink for flexible transparent micro-supercapacitor”, AMALGAM 2023 (Material Festival), Annual Technical Event, Department of Metallurgical and Materials Engineering, IIT Madras, Chennai, April 2023
 25. Jhansi Kokkiligadda, Neethu Thomas, Lakshman Neelakantan, and P. Swaminathan, “High aspect ratio silver nanowire synthesis by modified polyol method”, International Conference on Frontiers in Materials Engineering (ICFME 2022), IIT Indore, December 2022
 26. Meenu M. Solly, Neha Sharma, and P. Swaminathan, “A transparent photodetector based on a composite of silver and tungsten oxide nanowires”, 6th International Conference on Emerging Electronics (IEEE-ICEE), Bangalore, December 2022



27. Swati Suman, P. Swaminathan, Bhola Nath Pal, “Organic dye based longer wavelength photodetector for narrowband Application”, 6th IEEE-ICEE, Bangalore, December 2022
28. A. Sudha, Aarju Mathew Koshy, Faiz Ali, Meenu M. Solly, and P. Swaminathan, “Magnetron sputtered tungsten oxide films for electrochromic applications”, 6th IEEE-ICEE, Bangalore, December 2022
29. Garikapati Nagasarvari, Pamula Sreekeerthi, and P. Swaminathan, “Silver nanowire based transparent and flexible force sensors”, 2022 Materials Research Society (MRS) Fall Meeting, December 2022
30. Sanjeev Patil and P. Swaminathan, “Wet chemical synthesis of patterned bismuth ferrite thin films by direct writing (printing) and characterization using printed electrodes”, 2022 Materials Research Society (MRS) Fall Meeting, December 2022
31. A. Sudha, M.M. Jahanara, and P. Swaminathan, “Room temperature CO₂ sensor prepared from metal oxides”, 76th Annual Technical Meeting of the Indian Institute of Metals (IIM ATM 2022), Hyderabad, November 2022
32. Neha Sharma, Aarju Mathew Koshy, Debduutta Ray, and P. Swaminathan, “Printed flexible transparent micro-supercapacitor based on silver nanowire and PEDOT:PSS composite ink”, IIM ATM 2022, Hyderabad, November 2022
33. Sanjeev Patil and P. Swaminathan, “Wet chemical synthesis of patterned bismuth ferrite thin films by direct writing printing”, IIM ATM 2022, Hyderabad, November 2022
34. Meghna Narayanan, Aarju Mathew Koshy, and P. Swaminathan, “Direct writing of reactive inks based on electroless nickel deposition on pure aluminium”, IIM ATM 2022, Hyderabad, November 2022
35. Garikapati Nagasarvari, Pamula Sreekeerthi, Aarju Mathew Koshy, and P. Swaminathan, “Silver nanowire based transparent and flexible force sensors”, Symposium A, E-MRS Fall Meeting 2022, Poland, September 2022
36. Aarju Mathew Koshy, Neha S, Neethu Thomas, Jhansi K, and P. Swaminathan, “Capabilities of a direct write system for electronic device fabrication”, Saint-Gobain Technical Symposium University Collaboration, IITM Research Park, April 2022
37. Pamula Sreekeerthi, Nitheesh M. Nair, Garikapati Nagasarvari, and P. Swaminathan, “Planar capacitive touch sensors - A comparative study”, 14th International Conference on Sensing Technology (ICST 2022), IIT Madras, January 2022
38. Pamula Sreekeerthi, Nitheesh M. Nair, Garikapati Nagasarvari, P. Swaminathan, “Combined experimental and computational study of printed capacitive touch sensors”, XXI International Workshop on Physics of Semiconductor Devices (IWPSD 2021), IIT Delhi, December 2021
39. Faiz Ali, Lakshman Neelakantan, and P. Swaminathan, “Flexible Electrochromic Displays via Room Temperature Oxidation of Electroless Nickel”, XXI International Workshop on Physics of Semiconductor Devices (IWPSD 2021), IIT Delhi, December 2021
40. A. Sudha, A.M. Koshy, and P. Swaminathan, “Role of sintering temperature on the properties of tungsten oxide for gas sensing applications”, XXI International Workshop on Physics of Semiconductor Devices (IWPSD 2021), IIT Delhi, December 2021



41. Garikapati Nagasarvari, Pamula Sreekeerthi, and P. Swaminathan, "Silver nanoparticle-based flexible force sensors", XXI International Workshop on Physics of Semiconductor Devices (IWPSD 2021), IIT Delhi, December 2021
42. Nitheesh M. Nair, Mohammad Mahaboob Jahanara, Debdutta Ray, and P. Swaminathan, "Photoresponse of a printed transparent silver nanowire-zinc oxide nanocomposite", XXI International Workshop on Physics of Semiconductor Devices (IWPSD 2021), IIT Delhi, December 2021
43. Faiz Ali, Anirban Chakraborty, M. Prahalad, Lakshman Neelakantan, and P. Swaminathan, "Phosphorus Doped Nickel Oxide by Oxidation of Electroless Nickel Thin Films", ICTN: KLC, IIT Delhi, August 2021
44. Aarju M. Koshy, A. Sudha, S.K. Yadav, and P. Swaminathan, "Effect of substrate temperature on the optoelectronic properties of DC magnetron sputtered copper(I) oxide films", ICTN: KLC, IIT Delhi, August 2021
45. Chithra Lekha P, Aarju M. Koshy, Swaminathan P, Surender P, Somnath C. Roy, Myoor K. Padmanabhan, Roop L. Mahajan, "Flexible nanocellulose sheet for printed wearables", International Conference on Thin Films & Nanotechnology: Knowledge, Leadership, & Commercialization (ICTN: KLC), IIT Delhi, August 2021
46. Meghna Narayanan, Allakonda Harsha, Anirban Chakraborty, and P. Swaminathan, "Reactive Bilayers by self activated Electroless Nickel-Phosphorous deposition on pure Aluminum", NMD-ATM 2020, IIT Bombay, February 2021
47. Garikapati Nagasarvari, Prathama Pragya, Ruban. R, Shyama D. Ranade, Lakshman Neelakantan, and P. Swaminathan, "Polymer-metal oxide nanocomposite coatings for environmental protection", NMD-ATM 2020, IIT Bombay, February 2021
48. Nitheesh M. Nair, Debdutta Ray, and P. Swaminathan, "Simulation assisted flexibility improvement studies for flexible transparent printed touch sensors", 5th International Conference on Emerging Electronics (IEEE-ICEE 2020), IIT Delhi, November 2020. **Best poster award** in Flexible electronics and Organic semiconductors category
49. T. Bhargavi, Nitheesh M. Nair, Anagha Belavadi, and P. Swaminathan, "Silver nanowire-based flexible and transparent wearable heaters", 5th International Conference on Emerging Electronics (IEEE-ICEE 2020), IIT Delhi, November 2020
50. Manasa Hari Adavalli, Lakshman Neelakantan, and P. Swaminathan, "Template-assisted synthesis of nanowires for energy storage and gas sensing applications", 9th MRS-S Conference on Advanced Materials, November 2020
51. Garikapati Nagasarvari, Nitheesh M. Nair, Ruban.R, Prathama Pragya, Shyama D. Ranade, Lakshman Neelakantan, and P. Swaminathan, "Metal oxide-polymer nanocomposites for encapsulation of printed electronic devices", Saint-Gobain Technical Symposium University Collaboration, IITM Research Park, March 2020
52. Nitheesh M. Nair, Jayaram Kizhekke Pakkathilam, Kavitha Arunachalam, Debdutta Ray, and P. Swaminathan, "Printed antennas for automobile applications", Saint-Gobain Technical Symposium University Collaboration, IITM Research Park, March 2020
53. Kevin Daniel, Nitheesh M. Nair, and P. Swaminathan, "Silver nanowire-based flexible and transparent pressure sensors", International Conference on Functional Materials (ICFM), Kharagpur, Jan 2020. (**best poster award**).



54. Md. M. Jahanara, K.J. Barochia, and P. Swaminathan, "Electrical characterization of ZnO-NiO nanocomposite prepared by homogeneous precipitation", 6th International Conference on Advanced Nanomaterials and Nanotechnology (ICANN 2019), Guwahati, December 2019.
55. Garikapati Nagasarvari, Nitheesh M. Nair, Shyama D. Ranade, Lakshman Neelakantan, and P. Swaminathan, "Metal oxide-polymer nanocomposites for encapsulation of printed electronic devices", XXth International Workshop on Physics of Semiconductor Devices (IWPSD 2019), Kolkata, December 2019. **Dr. S.K. Agarwal memorial award for best poster.**
56. Hari Ramachandran, Manasa Adavalli, Meghna Narayanan, Md.M. Jahanara, Nitheesh M. Nair, L. Neelakantan and P. Swaminathan, "Towards All Oxide Transparent Printable Photodetectors using *p*-NiO Nanowires", XXth International Workshop on Physics of Semiconductor Devices (IWPSD 2019), Kolkata, December 2019.
57. Nitheesh M. Nair, Jayaram Kizhekke Pakkathillam, Garikapati Nagasarvari, Kavitha Arunachalam, Debdutta Ray, and P. Swaminathan, "Effect of encapsulation on printed transparent and flexible transmission lines", XXth International Workshop on Physics of Semiconductor Devices (IWPSD 2019), Kolkata, December 2019.
58. Garikapati Nagasarvari, Shyama D. Ranade, Nitheesh M. Nair, Lakshman Neelakantan, and P. Swaminathan, "Electrochemical impedance spectroscopic studies on PDMS-ZnO nanocomposite coatings for flexible electronics", International Conference on Advanced Materials and Processes for Defence Applications (ADMAT 2019), Hyderabad, September 2019.
59. Nitheesh M. Nair, Debdutta Ray, and P. Swaminathan, "Flexible and transparent printed silver nanowire-based heaters", International Conference on Advanced Materials and Processes for Defence Applications (ADMAT 2019), Hyderabad, September 2019. **First prize** in Innovation Pavilion Contest.
60. Garikapati Nagasarvari, Nitheesh M. Nair, Shyama D. Ranade, Lakshman Neelakantan, and P. Swaminathan, "PDMS-ZnO nanocomposites for encapsulation of printed electronic devices", 26th International Symposium on Metastable, Amorphous and Nanostructured Materials (ISMANAM 2019), Chennai, July 2019
61. Nitheesh M. Nair, K.P. Jayaram, Krishna Kumar, Kavitha Arunachalam, Debdutta Ray, and P. Swaminathan, "Silver nanowire-based nanocomposite ink for printed flexible transparent conducting applications", 10th International Conference on Materials for Advanced Technologies (ICMAT 2019), Singapore, June 2019
62. Arulkumar Ganapathi, Nitheesh M. Nair, P. Swaminathan, and Lakshman Neelakantan, "Synthesis of silver nanowires by self-ordered anodic aluminium oxide template for flexible electronics applications", 10th International Conference on Materials for Advanced Technologies (ICMAT 2019), Singapore, June 2019
63. Anirban Chakraborty, Prahalad Murali, and P. Swaminathan, "Transparent conducting p-type nickel oxide fabricated by annealing of phosphorous doped electroless nickel", International Workshop on Advanced Materials (IWAM) 2019, Dubai, February 2019
64. Hari Ramachandran, M. M. Jahanara, and P. Swaminathan, "Deposition and Characterization of Aluminum doped Zinc Oxide - Nickel Oxide Hetero-



- junctions”, Student academic conference, Inter IIT Tech Meet, IIT Bombay, December 2018 (**best presenter award**)
65. Nitheesh M. Nair, Debdutta Ray, and P. Swaminathan, “Direct printing of silver nanowires for transparent conducting electrode applications”, 4th International Conference on Emerging Electronics (ICEE) 2018, Bangalore, December 2018
 66. Nitheesh M. Nair, Debdutta Ray, and P. Swaminathan, “Silver nanowire – zinc oxide nanocomposite ink for printed flexible transparent conducting electrodes”, 3rd International Conference on Soft Materials (ICSM) 2018, Jaipur, December 2018 (**best poster award**)
 67. Md. Mahaboob Jahanara, Hari Ramachandran, and P. Swaminathan, “Non-linear I-V behavior of ZnO-NiO composite”, 3rd International Conference on Soft Materials (ICSM) 2018, Jaipur, December 2018
 68. K. Harish and P. Swaminathan, “Synthesis of aluminium doped zinc oxide for printed transparent electrode applications”, 3rd International Conference on Soft Materials (ICSM) 2018, Jaipur, December 2018
 69. Hari Ramachandran, Md. Mahaboob Jahanara, and P. Swaminathan, “Deposition and Characterization of *p*-NiO/*n*-AZO Heterojunctions”, 3rd International Conference on Soft Materials (ICSM) 2018, Jaipur, December 2018 (**best poster award**)
 70. Krishna Kumar, Mrudula Kavuri, and P. Swaminathan, “Effect of nanoparticles on liquid state dewetting of bismuth thin film”, Materials Research Society (MRS), Fall 2018 Meeting, USA, November 2018
 71. Anirban Chakraborty, Prahalad Murali, and P. Swaminathan, “Transparent conducting p-type nickel oxide thin films fabricated by annealing of phosphorous doped electroless nickel”, International Conference on Recent Trends in Materials Science and Technology (ICMST) 2018, Veli, Thiruvananthapuram, October 2018
 72. Arulkumar G, P. Swaminathan, and L. Neelakantan, “Fabrication of Anodic Aluminium Oxide (AAO) Templates to Produce Free-Standing Metallic Nanowires for Flexible Electronics”, 69th Annual Meeting of the International Society of Electrochemistry (ISE 2018), Italy, September 2018
 73. J.K. Pakkathillam, B.T. Sivaprakasam, J. Poojali, N.M. Nair, P. Swaminathan, C.V. Krishnamurthy, and K. Arunachalam, “Focal plane characterization of spot focusing horn antennas for free space microwave dielectric NDE”, 23rd International Workshop on Electromagnetic Nondestructive Evaluation (ENDE2018), Michigan State University, USA, September 2018
 74. Krishna Kumar and P. Swaminathan, “Fabrication of silica nanopillars by templated etching using bimetallic nanoparticles”, Symposium U, European Materials Research Society (E-MRS) 2018 Spring Meeting, France, June 2018
 75. Nitheesh M. Nair, Debdutta Ray, and P. Swaminathan, “Silver nanoparticle-based printed flexible antenna for Wi-Fi applications”, In-house symposium (IHS), Dept. of Metallurgical and Materials Engineering, IIT Madras, May 2018
 76. M. Suganaveswaran, Utkarsh Nayak, Somnath Saha, Nitheesh M. Nair, P. Swaminathan, and Prasanna Kumar, “Additive Manufacturing of Fractal Antenna for Electronics Applications”, 3rd International Conference on Progress in Additive Manufacturing (Pro-AM 2018), NTU Singapore, May 2018. DOI: <https://doi.org/10.25341/D49W29>



77. Krishna Kumar and P. Swaminathan, "Effect of nanoparticles on thermal stability of metallic thin films", Research Scholars Day (RSD) 2018, IIT Madras, April 2018 (**best poster award**)
78. Anirban Chakraborty, Anjali Adekar, and P. Swaminathan, "Kinetics of electroless Ni-P thin films on activated glass and SS316 substrates", National Metallurgists Day Annual Technical Meeting (NMD-ATM) 2017, BITS-Pilani, Goa, Nov 2017
79. Krishna Kumar and P. Swaminathan, "Characterization of bimetallic nanoparticles using electron microscopy", Electron Microscopy Society of India (EMSI) International Conference XXXVIII Annual Meeting, IGCAR Kalpakkam, June 2017
80. Sonia Sharma, Bankala Shashi Kiran, Krishna Kumar, and P. Swaminathan, "Transparent conducting electrodes by combined spin coating and thermal evaporation", 9th International Conference on Materials for Advanced Technologies (ICMAT 2017), Singapore, June 2017
81. Sonia Sharma, Sumukh Shankar Pande, and P. Swaminathan, "Physical synthesis and jetting behaviour of metal oxide based inks for printed electronics", Symposium T, E-MRS Spring Meeting 2017, France, May 2017 (**best poster award**)
82. Sonia Sharma and P. Swaminathan, "Printed electroluminescent devices based on metal oxides", Research Scholars Day (RSD) 2017, IIT Madras, March 2017
83. Shashi Kiran, Karthick Mani, Sonia Sharma, and P. Swaminathan, "Functional properties of spin coated Indium Tin Oxide (ITO) thin films", International Symposium for Research Scholars on Metallurgy, Materials Science and Engineering (ISRS), IIT Madras, Dec 2016
84. K.S. Suganthi, K. Harish, and P. Swaminathan, "Zinc oxide nanofluid ink for printed electronics", International Conference of Young Researchers on Advanced Materials (IUMRS-ICYRAM 2016), Bengaluru, Dec 2016
85. Krishna Kumar and P. Swaminathan, "Role of alloying on degradation of copper thin films", NMD-ATM 2016, IIT Kanpur, Nov 2016
86. Srinivas Karthik Y and P. Swaminathan, "An inkjet printed Schottky junction diode: Effect of the metal-semiconductor interface on diode properties", International Workshop on the Physics of Semiconductor Devices (IWPSD-2015), IISc Bengaluru, Dec 2015
87. Sonia Sharma, Sumukh S Pande, and P. Swaminathan, "A physical route for synthesis of metal oxide inks for printed electronics", National Metallurgists Day Annual Technical Meeting (NMD-ATM) 2015, Coimbatore, Nov 2015
88. Sonia Sharma, Pranith Ramesh, and P. Swaminathan, "Optical properties of transition metal doped zinc oxide", NMD-ATM 2014, Pune, Nov 2014
89. Sonia Sharma, Sudharsan, and P. Swaminathan, "Electrical conductivity of aluminium doped zinc oxide fabricated using spark plasma sintering", ISRS-2014, IIT Madras, Dec 2014
90. P. Swaminathan, D.A. LaVan, S.C. Barron, M.D. Vaudin, and T.P. Weihs, "Studying exothermic reactions in Ni-Al films using a nanocalorimeter", Gordon Research conference on Energetic Materials, New Hampshire, June 2010



91. P. Swaminathan, D.A. LaVan, R.K. Kumamuru, and T.P. Weihs, "Studying exothermic reactions in multilayer films using a nanocalorimeter", Nanomaterials Symposium, JHU/APL, Baltimore, April 2010
92. D.A. LaVan, P. Swaminathan, F. Yi, R.K. Kumamuru, M.D. Vaudin, L.H. Allen, and T.P. Weihs, "Nanocalorimetry for measurements of thermal and thermodynamic properties of thin films and MEMS materials", Materials Research Society, Boston, Nov 2010
93. P. Swaminathan, J.S. Palmer, and J.H. Weaver, "Competition between particle formation and burrowing: Gold on bismuth", American Vacuum Society, Boston, Oct 2008
94. P. Swaminathan, J.S. Palmer, and J.H. Weaver, "Nanoparticle assembly during thin film sublimation: Gold clusters on Bismuth", Physical Electronics Conference, UIUC, June 2007
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**SPONSORED
AND
INDUSTRIAL
PROJECTS**

Principal investigator (PI)

Ongoing

1. "Multi-functional layer development for RF connectivity/Meta surface and Display functionalities in automotive glazing", Saint Gobain Research India, 2022-2027, 91.92 lakhs, research based industrial project (RBIP). Co-I: Bobby George, EE, IITM.

Completed

1. "Electro-thermo-chromic touch displays", Technology Information Forecasting and Assessment Council (TIFAC), 2023-2024, 9.6 lakhs.
2. "Development of connectors, heaters, and antennas for automotive applications", Saint Gobain Research India, 2022-2023, 17 lakhs, RBIP.
3. "Development of transparent touch sensors and antennas for automotive applications", Saint Gobain Research India, 2020-2021, 15.8 lakhs, RBIP.
4. "Silver nanowire-based transparent and flexible tactile and force sensors", MHRD-STARS, 2020-2023, 46.04 lakhs
5. "Silver nanowire-based transparent flexible conducting films for wearable heater applications", Exploratory Research Proposal, IITM, 2020-2021, 9.6 lakhs
6. "Printable transparent AM/FM antennas", Innovative Projects, IP Office, IITM, 2020-2021, 2 lakhs
7. "Development of encapsulants for flexible electronics applications", Saint Gobain Research India, 2018-2019, 15.5 lakhs, RBIP. Co-I: L. Neelakantan, MME, IITM.



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8. **“Development of printed antennas for automotive applications”**, Saint Gobain Research India, 2018-2019, 8.5 lakhs, RBIP. Co-I: K. Arunachalam, Engineering Design, IITM.
 9. **“Adhesion of gold based coatings on intermetallic films”**, Titan Company Ltd, 2015-2016, 13.5 lakhs, RBIP. Co-I: L. Neelakantan, MME, IITM
 10. **“Use of second phase materials to enhance stability of metallic coatings”**, NRB, 2015-2018, 19.2 lakhs
 11. **“Ink jet printing of pure and doped luminescent metal oxide films”**, IITM, 2014-2018, 30 lakhs, new faculty seed grant

Co-investigator (Co-I)

Ongoing

1. **“Materials and manufacturing for futuristic mobility”**, IIT Madras under the Institute of Eminence scheme, Phase 2, 2023-2026, 500 lakhs. PI: Murugaiyan Amirthalingam, MME
2. **“Advanced Laser Material Processing and Surface Engineering”**, IIT Madras under the Institute of Eminence projects, Phase 2, 2023-2026, 205 lakhs. PI: G.L. Samuel, ME

Completed

1. **“First principles modeling and combinatorial electrodeposition of Cu-based alloys for IC interconnects”**, Lam Research India, 2018-19, 17.9 lakhs, RBIP. PI: S.K. Yadav, MME. Co-I: L. Neelakantan, MME
2. **“Nanoelectronics NETwork for Research and Applications (NNetRA)”**, DST, 2018-2023, 3170 lakhs. PI: Enakshi Bhattacharya, EE
3. **“Materials and Manufacturing for Futuristic Mobility”**, IIT Madras under the Institute of Eminence scheme, Phase 1, 2021-2022, 500 lakhs.

