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Google Scholar Citations

Books

Personal Data

Date of birth	: 30th May 1964
Nationality	: Indian
Gender	: Male

Education

M. Sc (*Master of Science*), **Industrial Physics**
Cochin University of Science & Technology, Kerala, India
Ph. D (*Doctor of Philosophy*), **Semiconductor Physics**
Cochin University of Science & Technology, Kerala, India
Thesis title: ***"Optical and thermal properties of selected ternary amorphous semiconductors".***
Postdoctoral Fellow
CSIR-National Institute for Interdisciplinary Science and Technology, Thiruvananthapuram, Kerala, India

Total Number of publications: 220+

Projects completed: 08

Projects Ongoing: 09

(3-National, 2-International, 4-SPARC)

No of Books Chapters: 20

No of Books edited: 32

Number of Ph. Ds Supervised: 19

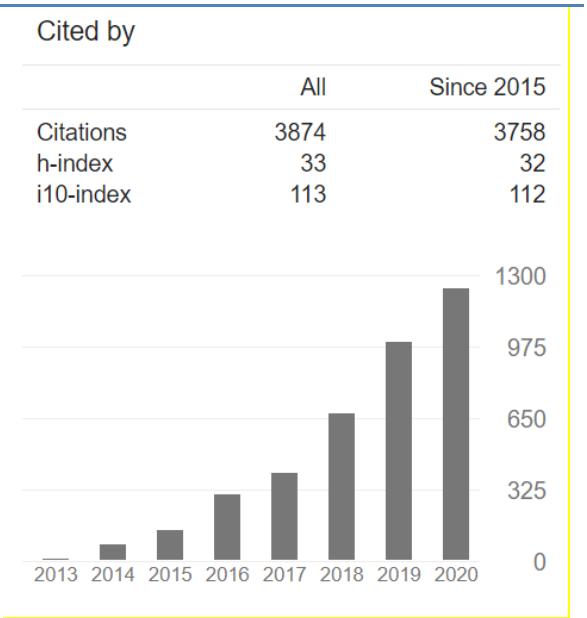
Number of Ph. Ds Co-Supervised: 9

Number of current Ph. D students: 08

Number of M. Phil and M.Sc. theses Supervised: 25

Google scholar profile

Books



Recognitions

- Professor@Lorraine, University of Lorraine, Nancy, France for three years from 2020-2022
- Listed in the Principal panel of scholars for the 2020-2021 **Fulbright–Nehru International Education Administrators Seminar Fellowship**
- CNRS Professor, Claud-Bernard Lyon University, Lyon, France
- Visiting Professor, Institute of Jean Lamour, Nancy, France
- Visiting Professor, Stockholm University, Sweden
- Visiting Professor, Jožef Stefan Institute, Ljubjana, Slovenia
- Guest Scientist, Leibniz-Institut fur Polymerforschung Dresden, Germany
- Visiting Fellow, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, India
- Visiting Fellow, Gulbarga University, Gulbarga, Karnataka under SAP scheme of UGC
- Visiting Faculty, Alemaya University (1998-2002) & Mekkele University (2006-2007), Ethiopia (on leave from Mahatma Gandhi University)
- Keynote Speaker in Malaysia Polymer International Conference (IMIC 2019) held during 31st October to 1st November 2019 at the Faculty of Science and Technology, Universiti Kebangsaan Malaysia, Malaysia
- Keynote Speaker in the WasteEng2018 conference held at Prague, Czech Republic held during 1-6 July 2019

- Keynote speaker in the International Conference on Polymer Processing and Characterization-ICPPC 2017 held at Gdansk University of Technology, Gdansk, Poland during 27-29 September 2017
- Invited speaker in the DAE SSPS 2018 held at Bhabha Atomic Research Centre, Mumbai in December 2017
- Invited speaker for the Silver Jubilee Research Conference on "Study of matter using intense radiation sources and under extreme conditions" organized by UGC-DAE CSR-Indore, India during 3-6 November 2016
- Conference Fellowship Award (Supported by Canon Corporation, Japan) of the Seventh International Conference on Phonon Scattering in Condensed Matter held at Cornell University, USA (1992)
- Research Associate Fellowship from DST & CSIR, Govt. of India (1992)
- Senior Research Fellowship from CSIR, Govt. of India (1990)
- Junior Research Fellowship from Department of Atomic Energy, Govt. of India (1987)

Teaching areas

- Materials Science/Solid State Physics, Quantum Optics, Statistical Physics, Quantum Mechanics, Classical Mechanics, Physics of Nanomaterials, Mesoscopic Physics, Introduction to Nanoscience and Nanotechnology (Open Course), Experimental Physics, Nanophotonics

Research Areas

The research works of my group include the syntheses, characterization and applications of various Nanomaterials, LASER Plasma, ion irradiation effects on various novel materials and phase transitions. The different topics of current research works are:

- **Nanomultiferroics**
  In this class of materials we are synthesizing various systems such as R-CrO_3, R-MnO_3 and R-Fe_2O_4 where R could be Ho, Er, Tm, Yb, Lu or Y. The samples are prepared mainly through sol-gel route and characterized for their structural, multiferroic, linear and nonlinear optical properties using TGA/DTA, XRD, SEM, HRTEM, FTIR spectroscopy, Dielectric spectroscopy, VSM, UV-Vis-NIR spectroscopy, Photoluminescence spectroscopy and Z-scan technique. The thermal parameters such as heat capacity, thermal conductivity and thermal diffusivity are also investigated near the multiferroic transitions. The synthesis and multiferroic coupling of composite nano/multiferroics are also a thrust area of the group.
- **Nanosemiconductors and Nanophosphors**
  In this class of materials we concentrate on quantum dots, metal oxides and Sr_2CeO_4 type materials. The materials are prepared through novel green synthesis routes and sol-gel method and characterized for their various properties. The potential uses of these materials are being explored in different fields which include water purification, sensing and lighting applications.

- **Nanocomposites**
  Under this class of materials various metal, metal oxide, carbon structures (grapheme and CNT), magnetic particles and quantum dot filled polymer nanocomposite materials are prepared using various chemical routes. The interfacial effects of the as prepared nanocomposites are also a thrust area for the group.
- **Nanoferroelectrics**
  Under this class, we are mainly concentrating on relaxor type of ferroelectrics such as Strontium Barium Niobate systems and the effect of rare earth ion doping on the linear and nonlinear optical properties. The samples are being characterized for various properties using sophisticated techniques. The phase transitions in this class of materials are also investigated in detail.
- **Nanoferrites**
  Different nanostructured spinel ferrite systems have been prepared using sol-gel technique and their structural, magnetic, electrical, linear and nonlinear optical properties are investigated. Various systems such as $NiFe_2O_4$, $CoFe_2O_4$, $ZnFe_2O_4$ and mixed compositions of these ferrites have been synthesized and their various physical properties are investigated. The water soluble nanoferrites are also of potential interest to the group.
- **Nanomedicine**
  Under this area, we are mainly concentrating on the preparation and characterization of Polymer based scaffolds for biomedical applications. New hybrid polymer nanocomposites for dental applications are also a thrust of our group.
- **Nanosensors**
  The various nanomaterials synthesized in the laboratory are explored for different sensing applications which include nanoparticles incorporated membranes for bio-sensing and adulterants.
- **Laser-Matter interactions**
  The laser based experiments include Pulsed Laser Deposition (PLD) of thin films, Optical limiting studies using Z-scan technique, Laser induced breakdown spectroscopy, Random lasing in novel nanomaterials and Laser plasma in liquids.
- **Ion beam irradiation effects & Phase transitions**
  Heavy ion beam irradiation effects on the structural and multiferroic properties of sol-gel derived films of selected nanomultiferroic films are investigated under this category. The studies on the phase transitions of bulk and nanomaterials are also investigated using different techniques.
- **Climate Change**
  Aerosol samples collected from urban and semi urban areas of Indian subcontinent are analyzed for chemical characteristics and effects on climatic conditions and atmospheric pollution. Single particle analysis of airborne samples from different altitudes of *Indo Gangetic Planes* and eastern metropolitan areas for source approximation and climate modeling, and cloud seeding are of current interest.

- **Water**

  Development of hybrid materials for water purification, Photocatalysts for the degradation of pesticides and herbicides, Biosensors for detection of pathogens and antibiotics in water bodies

Facilities available

A very good wet chemistry synthesis laboratory with major infrastructure facilities such as Furnaces, Centrifuge, Magnetic stirrers, pH meters, Hot air ovens, Microwave oven, Pelletizer, Ultrsonicator and Spin Coaters, Nanobiology with facility for antibacterial studies, Pulsed Laser Deposition, Laser Plasma and NLO facility with Nd:YAG LASER, ICCD camera and Spectrograph, He-Ne LASER, Quadrant Detector etc.

For experimental characterizations, Dielectric and resistivity measurement facilities from 77K to 773K, UV-Vis_NIR spectrophotometer, Spectrophotoflourimeter with life time measurement facility, X-ray diffractometer, Single Crystal X-ray diffractometer, ME coupling measurement unit, AFM, HRTEM, Electrospinning Unit, Vibrating Sample Magnetometer are available.

SEM, Confocal Raman with AFM, GCMS etc. are available as Central facilities of the University

Research Grants

National-Ongoing

- Physics of Cavitation Bubbles and Hydrogen Generation during Liquid Phase Laser Ablation-BRNS/BRFST-DAE-Govt. of India-**Ongoing**- (**Principal Investigator**)
  Amount received: 32.68 Lakhs
- Design and applications of magnetically responsive self-assembled polymer nanocomposites, DST-Nano Mission-Govt. of India-**Ongoing**-(**Principal Investigator**)
  Amount received: 223.45 Lakhs from DST-Govt. of India+ 40 Lakhs from Higher Education Department, Govt. of Kerala as matching grant
- Heavy Ion/Gamma ray Engineered Vertically Oriented Graphene Hybrid systems for Environmental Remediation, UGC-DAE-CSR Kolkata Centre Project-**Ongoing**-(**Principal Investigator**)
  Amount received: 7.45 Lakhs+Travel
- Graphene-Silica conjugated epoxy nanocomposites for protective coating and repair applications, DRDO, Ministry of Defence of the Government of India- **Ongoing**-(**Principal Co-Investigator**)
  Amount received: 21.45 Lakhs
- Visvesvaraya PhD Scheme for Electronics and IT, MeitY, Ministry of Communications and Information Technology, Government of India-**Ongoing**-(**Principal Co-Investigator**)
  Amount received: 89.77 Lakhs
- Gamma Ray/Heavy Ion Assisted Cross linked Silicone Rubber Based EMI Shielding Materials, UGC-DAE-CSR Kolkata Centre Project-**Ongoing**-(**Principal Co-Investigator**)
  Amount received: 11.25 Lakhs

- Self assembled Nanostructured Silica-Graphene oxide core-shell particles reinforced natural rubber composites for green tyres, Nano Mission-DST-Govt. of India-**Ongoing-(Principal Co-Investigator)**
  Amount received: 100.2 Lakhs
- Novel thermoplastic elastomer composition for Neutron Shielding applications-BRNS-DAE-Govt. of India-Ongoing (**Principal Co-Investigator**)
  Amount received: 35.33 Lakhs
- Design and implementation of small scale environmental energy harvesters by piezoelectric/multiferroic polymer nanocomposites**-Scheme for Transformational and Advanced Research in Sciences (STARS),** Ministry of Human Resource Development (MHRD)-Govt. of India-Ongoing (**Principal Co-Investigator**)
  Amount received: 50.56 Lakhs

- **SPARC Funded by MHRD-Govt. of India projects-Ongoing-(Principal Investigator)**

Project Title	**Collaborating University**	**Sanctioned Budget**
Bio-filler-Interfaced Electrospun PVDF Hybrid Piezoelectric Generator for Mechanical Energy Harvesting	Université De Montpellier & University of Lorraine, France	Rs. 78,93,348
Study of urea oxidation electrocatalysis for energy conversion from waste	Ben Gurion University of the Negev & Ariel university, Israel	Rs. 66,69,785
Vachellia nilotica based biocompatible hybrid nanostructured coatings/films for seeds and fruits	North Carolina State University & Kansas State University, USA	Rs. 66,30,385
Nanoscale contrast agents for diagnostic biomedical imaging	Nanyang Technological University (NTU) , Singapore	Rs. 59,88,299

International-Ongoing:

1. Biobased Scaffolds, Membranes and Hydrogels for Improved Wound Healing and Bone Regeneration (BIOHEAL)-Swedish Research Link Grant in collaboration with Prof. Aji Mathew, *University of Stockholm, Sweden*
2. Advanced Nanocomposites for Micro and Nanosensors Applications-under the PICS scheme with Prof. Didier ROUXEL, *Institut Jean Lamour* - UMR CNRS n°7198 - *Université de Lorraine*- BP 70239 - 54506 Vandœuvre-lès-Nancy Cedex – *France*

Projects completed:

1. Irradiation effects on the structural and electrical properties of selected ferroelectric ceramics, NSC-UFUP project-IAC-Govt. of India-(**Principal Investigator**)-**Completed**

2. Ion beam irradiation effects on the structural and ferroic properties of selected sol-gel derived films of nanomultiferroics-UGC-DAE-CSR Kolkata Centre Project- (**Principal Investigator**)-**Completed**
3. Nanoparticle aggregation behavior in polymer nanocomposites- UGC-DAE-CSR Kolkata Centre Project-**Completed** -(**Principal Investigator**)
4. Development of one dimensional multiferroic nanocomposites for device applications" under the SRS scheme- KSCSTE-Govt. of Kerala-**Completed**-(**Principal Investigator**)
5. Nano Materials: Synthesis, characterization and applications, DST, New Delhi (**Principal Co-Investigator**)-**Completed**
6. Novel thermoplastic elastomer composition for Neutron Shielding applications, BRNS, Department of Atomic Energy, Govt. of India-(**Principal Co-Investigator**)-**Completed**
7. Development of supertough thermosets from self assembled Nanostructured block copolymer/epoxy resin blends, DRDO, Ministry of Defence of the Government of India-(**Principal Co-Investigator**)-**Completed**
8. Development of engineered nano-structured materials for high performance applications-DST-Nano Mission-Govt. of India-(**Principal Co-Investigator**)-**Completed**
9. Development of Multi Walled Carbon Nanotube Filled Polycarbonate/ Polypropylene Double Percolating Conductive Polymer Blend Nanocomposites for Electromagnetic Interference Shielding Gaskets for Mobile Phones.–DIT-New Delhi-**(Principal Co-Investigator**)-**Completed**
10. Miscibility, morphology and properties of NR/SBR and BR based binary and ternary rubber blends and the influence of CB and silica filler distribution on blend properties, MRF Corp Limited, Chennai, Tamil Nadu 6000-**(Principal Co-Investigator**)-**Completed**
11. Novel Thermoplastic Elastomer composition for neutron shielding applications, BRNS – DAE, Govt. of India-**Completed**-(**Project Co-Investigator**)
12. Studies on cellulose nanocrystals and their applications in nanocomposites with varying technological applications, DST, Govt. of India-**(Principal Co-Investigator**)-**Completed**
13. Development of super tough nanocomposites from epoxy resin, liquid rubber and nanoclay, Kerala State Council for Science, Technology and Environment (KSCSTE under the SARD program-**Completed**-(**Project Co-Investigator**)
14. Engineering of Nanostructured high performance epoxy liquid blends with controlled nanoparticle localization, CSIR, Ministry of Science and Technology, Govt. of India -**Completed**-(**Project Co-Investigator**)
15. High performance nanoclay nanocomposites for dental application, ICMR, coordination and promotion of biomedical research, Govt. of India-**Completed**-(**Project Co-Investigator**)
16. Systematical investigation of mechanical properties of composites materials made from plasma modified thermoplastic matrix and fiber filler, SurfaceTreat, Inc., U Skladiště 2125, 511 01 Turnov, Czech Republic-**Completed**-(**Project Co-Investigator**)

Patents granted/filed

1. A polymer Nanocomposite, Process, And Application there-of, WIPO Publication number: WO2016142848 A1, Publication date: Sep 15, 2016, and Indian patent Application No: 638/DEL/2015 Mohammed Arif P, Sabu Thomas, **Nandakumar Kalarikkal**

2. New Poly(trimethyleneterephthalate) basednanocomposite formulation for EMI Shielding;Patent Application No:201841003767Aswathi M.K, AjithaA.R , Dr. SabuThomas, **Dr. NandakumarKalarikkal**, M. Padmanabhan, Lovely P. Mathew
3. MWCNTs reinforced polymer blend nanocomposites of Poly(trimethylene terephthalate) and Polypropylene for EMI shielding application; Patent ApplicationNo:201841003768 Ajitha A R, Aswathi M K, Dr. Sabu Thomas, **Dr. Nandakumar Kalarikkal**, Lovely Mathew P, Geethamma V G
4. Invention of High Performance EMI Shielding Coating From Low Cost Carbon Black with XLPE;Patent Application No: 201841040343; Apparao Gudimalla, Jince Thomas, Dr. Sabu Thomas, **Dr. Nandakumar Kalarrikkal**, Zakiah Ahmad
5. Nano Cellulose based EMI shields preparation and thereof; Patent Application No: 201841040344; Deepu A Gopakumar, Avinash R Pai, **Dr. Nandakumar Kalarikkal** and Dr. Sabu Thomas
6. Solid one dimensional conducting polymer fibers using electrospinning ; Dr. Sanal Sebastian Payyappilly, Jayesh Cherusseri, Prof. Sabu Thomas, Dr. NandakumarKalarikkal; Patent Application No: 201841040346

Research Collaborations

- Bhabha Atomic Research Centre, Mumbai, India
- Raman Research Institute, Bangalore, India
- Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, India
- UGC-DAE Consortium for Scientific Research-Kolkata Centre, Kolkata, India
- Cochin University of Science & Technology, Kochi, India
- Inter University Accelerator Centre, New Delhi, India
- Central University, Kannur, Kerala, India
- Indian Institute of Science, Bangalore, Karnataka, India
- Indian Institute of Tropical Meteorology, Pune, India
- Walter Sisulu University, South Africa
- Johannesburg University, South Africa
- Jožef Stefan Institute, Ljubjana, Slovenia
- Uninversity of Technology- MARA, Malaysia
- University of Lorraine & Institute of Jean Lamour, France
- University of South Brittany, Lorrient, France
- Kansas State University, USA
- North Carolina State University, USA
- Deakin University, Australia
- Stockholm University, Sweden
- Nanyang Technological University, Singapore
- Ariel University, Israel
- Ben Gurion University of the Negev, Israel

- Université De Montpellier, France
- Institue of Light Matter, Claude Bernard University Lyon, France

Publications (2020)

1. Transport and solvent sensing characteristics of styrene butadiene rubber nanocomposites containing imidazolium ionic liquid modified carbon nanotubes, Abraham, J., SidhardhanSisanth, K., Zachariah, A. K., Mariya, H. J., George, S. C., **Kalarikkal, N**., & Thomas, S. *Journal of Applied Polymer Science*, *137*(46), 49429, 2020
2. BaTiO3/ZnOheterostructured photocatalyst with improved efficiency in dye degradation, Kappadan, S., Thomas, S., &**Kalarikkal, N.***Materials Chemistry and Physics*, *255*, 123583, (2020)
3. Facile fabrication of microporous polypropylene membrane separator for lithium-ion batteries, Bicy, K**., Kalarikkal, N.**, Stephen, A. M., Rouxel, D., & Thomas, S, *Materials Chemistry and Physics*, *255*, 123473, 2020.
4. Ultra-fast heat dissipating aerogels derived from polyaniline anchored cellulose nanofibers as sustainable microwave absorbers, Pai, A. R., Binumol, T., Gopakumar, D. A., Pasquini, D., Seantier, B., **Kalarikkal, N**., & Thomas, S, *Carbohydrate Polymers*, *246*, 116663, 2020
5. Observation of room temperature multiferroicity in CuO-doped Sr 3 Bi 4 Ti 6 O 21 lead-free ferroelectric ceramics, Elayaperumal, E., Malathi, M., Murugesan, G., Mayeen, A., & **Kalarikkal, N,** *Journal of Materials Science: Materials in Electronics*, 1-10, 2020
6. Polylactic acid/nano chitosan composite fibers and their morphological, physical characterization for the removal of cadmium (II) from water, Thomas, Merin S., Prasanth KS Pillai, Marisa Faria, Nereida Cordeiro, Lekshmi Kailas, **Nandakumar Kalarikkal**, Sabu Thomas, and Laly A. Pothen. *Journal of Applied Polymer Science* 137(34), 48993, 2020
7. Effects of nanofillers on morphology and surface wetting of microporous polypropylene composite membranes. Bicy, K., **Nandakumar Kalarikkal**, Arul Manuel Stephen, Didier Rouxel, and Sabu Thomas, *Materials Chemistry and Physics* 123742, 2020
8. Dysprosium-substitution-induced structural changes of multiferroic nanocrystalline bismuth ferrite and the investigation through positron annihilation and other studies, Cyriac, J., Augustine, S., **Kalarikkal, N**., Mukherjee, S., Ahmed, M. and Nambissan, P.M.G., *Physica B: Condensed Matter*, p.412431, 2020
9. Gold nanoparticles against respiratory diseases: oncogenic and viral pathogens review, Pal, K., Zaheer, T., **Kalarikkal, N**., Thomas, S., de Souza, F.G. and Si, A., *Therapeutic Delivery*, *11*(8), pp.521-534, 2020
10. Grape seed extract-soluplus dispersion and its antioxidant activity. Rajakumari, R., Volova, T., Oluwafemi, O.S., Rajesh Kumar, S., Thomas, S. and **Kalarikkal, N.,** *Drug Development and Industrial Pharmacy*, *46*(8), pp.1219-1229, 2020.
11. Dielectric Properties of PMMA Films Reinforced with Ag/rGO Hybrid Composites, Jose PP, Kala M S, **Kalarikkal N**, Thomas S, Journal of Electronic Materials, Jul 21:1-0, 2020
12. Cure Acceleration and Plasticizing Effect of Imidazolium Ionic Liquid on the Properties of Natural Rubber/Carbon Nanotube Composites, Therattil JA, Kumar A, Pothan LA,

Maria HJ, Rouxel D, **Kalarikkal N**, Thomas S. Functional Composites and Structures. Jul 20, 2020

13. Thermal and electrical properties of phenol formaldehyde foams reinforcing with reduced graphene oxide. Sandhya, P.K., Sreekala, M.S., Boudenne, A., Garnier, B., Rouxel, D., Padmanabhan, M., **Kalarikkal, N**. and Thomas, S., *Polymer Composites*, 2020

14. Transformation of essential minerals into tablet formulation with enhanced stability. Rajakumari, R., Volova, T., Oluwafemi, O.S., Thomas, S. and **Kalarikkal, N**., *Advanced Powder Technology*, 31(7), July pp 2806-2819, 2020.

15. Room temperature ferromagnetism in carbon doped MoO3 for spintronic applications: A DFT study, Davis, B.A., Chakraborty, B**., Kalarikkal, N**. and Ramaniah, L.M.,. *Journal of Magnetism and Magnetic Materials*, *502*, p.166503, 2020.

16. Application of novel zinc oxide reinforced xanthan gum hybrid system for edible coatings, Joshy, K.S., Jose, J., Li, T., Thomas, M., Shankregowda, A.M., Sreekumaran, S., **Kalarikkal, N**. and Thomas, S., *International Journal of Biological Macromolecules*, *151*, pp.806-813, 2020

17. Flexible dopamine-functionalized BaTiO3/BaTiZrO3/BaZrO3-PVDF ferroelectric nanofibers for electrical energy storage, Mayeen A, Kala MS, Sunija S, Rouxel D, Bhowmik RN, Thomas S, **Kalarikkal N**. Journal of Alloys and Compounds. May 8:155492, 2020

18. Casein mediated synthesis of stabilized metal/metal-oxide nanoparticles with varied surface morphology through pH alteration. Rakhimol, K.R., Thomas, S., **Kalarikkal, N**. and Jayachandran, K., *Materials Chemistry and Physics*, *246*, p.122803, 2020

19. Carboxymethylcellulose hybrid nanodispersions for edible coatings with potential anti-cancer properties. Joshy KS, Augustine R, Li T, Snigdha S, Hasan A, Komalan C, **Kalarikkal N,** Thomas S. International Journal of Biological Macromolecules. Vol. 157, pp 350-358, Apr 26, 2020

20. Novel interpenetrating polymeric network based microbeads for delivery of poorly water soluble drug, Ghosal, K., Adak, S., Agatemor, C., Praveen, G., **Kalarikkal, N**. and Thomas, S.,. *Journal of Polymer Research*, *27*(4), pp.1-11, 2020

21. Viscoelastic and electrical properties of RGO reinforced phenol formaldehyde nanocomposites. Sandhya, P.K., Sreekala, M.S., Xian, G., Padmanabhan, M., **Kalarikkal, N**. and Thomas, S., *Journal of Applied Polymer Science*, p.49211, 2020

22. Tunning of photoluminescence emission of Y2SiO5: Tb3+, Eu3+ phosphors by altering the Tb3+, Eu3+ ratio, Upadhyay K, Thomas S, **Kalarikkal N,**Tamrakar RK. Materials Today: Proceedings, Mar 27, 2020

23. Magnetically recoverable Ir/IrO2@ Fe_3O_4 core/SiO_2 shell catalyst for the reduction of organic pollutants in water. Thekkathu, R., Ashok, D., Ramkollath, P. K., Neelakandapillai, S., Kurishunkal, L. P., Yadav, M. P., &**Kalarikkal, N**. *Chemical Physics Letters*, *742*, 137147, 2020

24. Strengthened magnetoelectric multiferroic response in (K0. 5Na0. 5 [Nb1-xFex/2Mnx/2] O3) ceramics, Shalini, K., Pappachan, S., Mayeen, A., **Kalarikkal, N.**, &Giridharan, N. V. *Materials Letters*, *261*, 126988, 2020

25. Development of biocompatible and biofilm-resistant silver-poly (methylmethacrylate) nanocomposites for stomatognathic rehabilitation, Gopalakrishnan, S., Mathew T, A.,

Mozetič, M., VP, J., Jose, J., Thomas, S. and **Kalarikkal, N**., *International Journal of Polymeric Materials and Polymeric Biomaterials*, *69*(3), pp.186-199, 2020

26. Influence of spinel ferrites in the modification of magneto-electric coupling effect in $BiFeO_3$. Augustine P, Narayana Y, **Kalarikkal N**, Materials Today: Proceedings. Jan 23, 2020
27. Tailoring the dielectric and magnetic properties of Eu-substituted $BiFeO_3$ nanoparticles. Cyriac J, John JC, **Kalarikkal N**, Augustine S. Materials Today: Proceedings. Jan 21 2020
28. Defects characterisation and studies of structural properties of sol–gel synthesised $MgFe_2O_4$ nanocrystals through positron annihilation and supportive spectroscopic methods. Abraham, A.R., Raneesh, B., Nambissan, P.M.G., Sanyal, D., Thomas, S. and **Kalarikkal, N**.,. *Philosophical Magazine*, *100*(1), pp.32-61, 2020
29. "Influence of reduced graphene oxide on flow behaviour, glass transition temperature and secondary crystallinity of plasticized poly (vinyl chloride), Akhina, H., Koduvayur A. Ramya, MR Gopinathan Nair, Allisson Saiter-Fourcin, Marie-Rose Garda, Abhijit P. Deshpande, **Nandakumar Kalarikkal,** and Sabu Thomas., *RSC Advances* 10, no. 49 : 29247-29256, 2020
30. Positron annihilation spectroscopic characterization of free-volume defects and their correlations with the mechanical and transport properties of SBR–PMMA interpenetrating polymer networks, James, J., Thomas, G.V., Madathil, A.P., Nambissan, P.M.G**., Kalarikkal, N**. and Thomas, S., *Physical Chemistry Chemical Physics*, *22*(32), pp.18169-18182, 2020
31. Material aspects during additive manufacturing of nano-cellulose composites.", Joseph, Blessy, Jemy James, Yves Grohens, **Nandakumar Kalarikkal,** and Sabu Thomas. In *Structure and Properties of Additive Manufactured Polymer Components*, pp. 409-428. Woodhead Publishing, 2020
32. Gas Barrier, Rheological and Mechanical Properties of Immiscible Natural Rubber/Acrylonitrile Butadiene Rubber/Organoclay (NR/NBR/Organoclay) Blend Nanocomposites, Maria, H. J., Thomas, M. G., Morreale, M., La Mantia, F. P., Nzihou, A., Joseph, K., ... & Thomas, S., *Materials*, *13*(11), 2654, 2020
33. Enhanced Magnetoelectric Coupling and Dielectric Constant in Flexible Ternary Composite Electrospun Fibers of PVDF-HFP Loaded with Nanoclay and $NiFe_2O_4$ Nanoparticles. Chacko SK, Rahul MT, Raneesh B**, Kalarikkal N.,** New Journal of Chemistry. 2020
34. Application of novel zinc oxide reinforced xanthan gum hybrid system for edible coatings, Joshy, K.S., Jose, J., Li, T., Thomas, M., Shankregowda, A.M., Sreekumaran, S., **Kalarikkal, N**. and Thomas, S., *International Journal of Biological Macromolecules*, *151*, pp.806-813, 2020
35. Second harmonic scattering from mass characterized 2D graphene oxide sheets. Russier-Antoine, I., Fakhouri, H., Basu, S., Bertorelle, F., Dugourd, P., Brevet, P.F., Velayudhan, P., Thomas, S., **Kalarikkal, N**. and Antoine, R., *Chemical Communications*, *56*(27), pp.3859-3862, 2020
36. Reduced graphene oxide/silver nanohybrid as a multifunctional material for antibacterial, anticancer, and SERS applications. Jose, P.P.A., Kala, M.S., Joseph, A.V., **Kalarikkal, N**. and Thomas, S., *Applied Physics A*, *126*(1), pp.1-16, 2020.

37. Defect-focused analysis of calcium-substitution-induced structural transformation of magnesium ferrite nanocrystals, Abraham, A.R., Raneesh, B., Sanyal, D., Thomas, S., **Kalarikkal, N.** and Nambissan, P.M.G.,.*New Journal of Chemistry*, *44*(4), pp.1556-1570, 2020
38. Natural rubber nanocomposites with MWCNT@ POSS hybrid filler: Preparation and properties. Somasekharan, L., Xavier, P., Bose, S., Zachariah, A.K., **Kalarikkal, N.**, Anil Kumar, S. and Thomas, S., *Polymer Composites*, *41*(1), pp.369-380, 2020
39. Nano formulated proanthocyanidins as an effective wound healing component, R Rajendran, T Volova, OS Oluwafemi, S Rajeshkumar, S Thomas, **Nandakumar Kalarikkal** Materials Science and Engineering: C 106, 110056, 2020
40. Polyurethane glycolysate from industrial waste recycling to develop low dielectric constant, thermally stable materials suitable for the electronics, Reghunadhan, A., Datta, J., Jaroszewski, M., **Kalarikkal, N**. and Thomas, S., *Arabian Journal of Chemistry*, *13*(1), pp.2110-2120, 2020

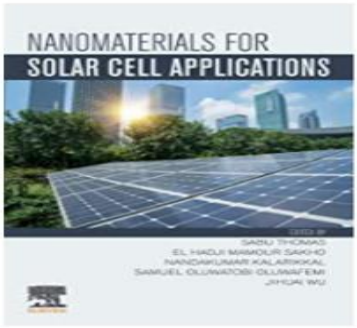
Book Chapters

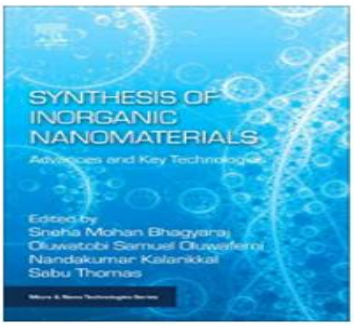
1. **Role of wound dressings in the management of chronic and acute diabetic wounds** Robin Augustine**, Kalarikkal, N**., Thomas, S. In Diabetes Mellitus and Human Health Care: A Holistic Approach to Diagnosis and Treatment; George, A., Augustine, R., Sebastian M. Eds.; Apple Academic Press: (2014)
2. **Thin Film and Nanostructured Multiferroic Materials**, B. Raneesh and **Nandakumar Kalarikkal** in the book Advanced Nanomaterials: Synthesis, Properties, and Applications, Apple Academy Press (2014)
3. **Current Advances in Nanomedicine: Applications in Clinical Medicine and Surgery**, Indu Raj P, Vinod Kumar, and **Nandakumar Kalarikkal** in the book Advanced Nanomaterials: Synthesis, Properties, and Applications, Apple Academy Press (2014)
4. **Recent Advances in Nanomedicine: Applications in Diagnosis and Therapeutics**, Sandhya Gopalakrishnan, Kannan Vaidyanathan, and **Nandakumar Kalarikkal** in the book Advanced Nanomaterials: Synthesis, Properties, and Applications published by Apple Academy Press (2014)
5. **Tissue Engineering: Principles, recent trends and the future,** Ansuja P Mathew, Robin Augustine, Nandakumar Kalarikal, Sabu Thomas: In Nanomedicine and Tissue engineering- State of the art and recent trends, Apple Academic Press, Inc. (2015)
6. **Nanomedicine: from concept to reality** Rakhimol K.R, Robin Augustine, Sabu Thomas, Nandakumar Kalarikkal: In Nanomedicine and Tissue engineering- State of the art and recent trends, Apple Academic Press, Inc. (2015)
7. **Electrospun matrices for biomedical applications–Recent advances,** Deepa P. Mohanan, Robin Augustine**,** Nandakumar Kalarikkal, Radhakrishnan E.K, Sabu Thomas: In Nanomedicine and Tissue engineering- State of the art and recent trends, Apple Academic Press, Inc. (2015)
8. **Cutaneous wound care: Grafts to tissue engineered skin substitutes,** Robin Augustine, Bhavana Venugopal, Nandakumar Kalarikkal, Sabu Thomas: In Nanomedicine and Tissue engineering- State of the art and recent trends, Apple Academic Press, Inc. (2015)

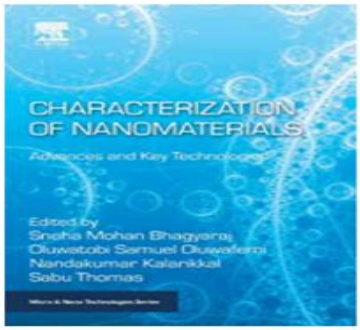
9. **Polyuronates and their application in drug delivery and cosmetics, Robin Augustine,** Snigdha S, Nandakumar Kalarikkal, Sabu Thomas: In Green Polymer and The Environment Pollution Control, Apple Academic Press, Inc. (2015)
10. **Nanomedicine: From Concept to Reality,** K R Rakhimol, R Augustine, S Thomas, N. Kalarikkal - Nanomedicine and Tissue Engineering: State of the Art and Recent Trends CRC Press, pages 1-30, 2016, ISBN 9781771881180
11. **Tissue Enginering: Principles, Recent Trends and the Future,** A P Mathew, R Augustine, N Kalarikkal, S Thomas- Nanomedicine and Tissue Engineering: State of the Art and Recent Trends, 31-82, 2016, ISBN 9781771881180
12. **Polyuronates and their application in drug delivery and cosmetics,** R Augustine, S S Bhavana Venugopal, N Kalarikkal, S Thomas, Green Polymers and Environmental Pollution Control, 239-269
13. **Biopolymer-Application in Nanoscience and Nanotechnology,** Sneha Mohan, Oluwatobi S. Oluwafemi, Nandakumar Kalarikkal, Sabu Thomas and Sandile P. Songca (2016).
14. Recent Advances in Biopolymers, Dr. Farzana Khan (Ed.), InTech, DOI: 10.5772/62225.
15. **Monitoring and separation of food-borne pathogens using magnetic nanoparticles,** Robin Augustine, Ann Rose Abraham, Nandakumar Kalarikkal, Sabu Thomas, In Book: Novel Approaches of Nanotechnology in Food, pp.271-312 (2016)
16. **Environmental Fate of Zinc Oxide Nanoparticles: Risks and Benefits**, N. Kalarikkal et. al., DOI: 10.5772/65266, In book: Toxicology - New Aspects to This Scientific Conundrum
17. **Development of ceramic-controlled piezoelectric devices for biomedical applications**

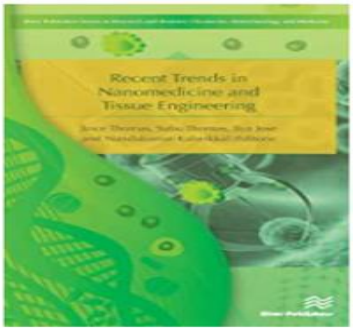
    A Mayeen, **N Kalarikkal,** DOI:10.1016/B978-0-08-102203-0.00002-0, In book: Fundamental Biomaterials: Ceramics, pp.47-62
18. Conducting Polyurethane Composites. Mishra, R.K., Abraham, J., Joseph, K., Jayanarayanan, K., Kalarikkal, N. and Thomas, S., In *Polyurethane Polymers*, chapter12, (pp. 365-399). Elsevier, 2017.
19. Dynamic Light Scattering (DLS). Thomas, S. and Kalarikkal, N., *Chapter*, *2*, pp.37-49.2017

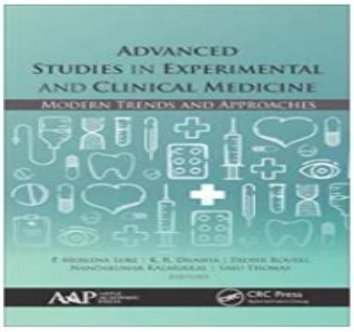
Books Edited-32

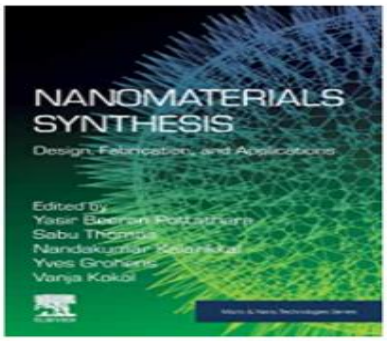


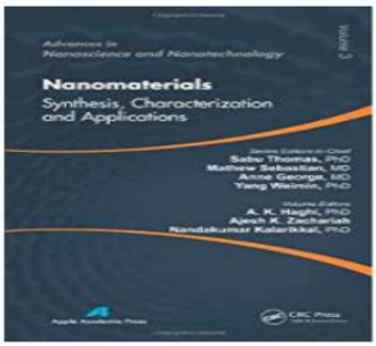


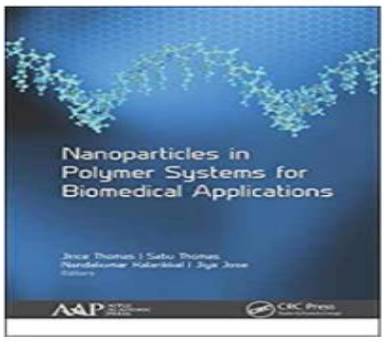


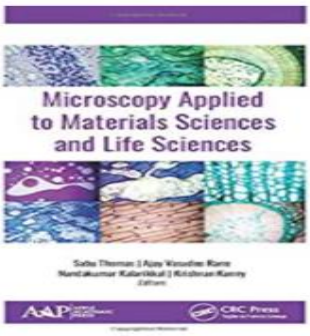


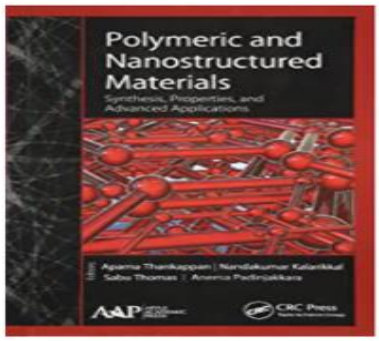


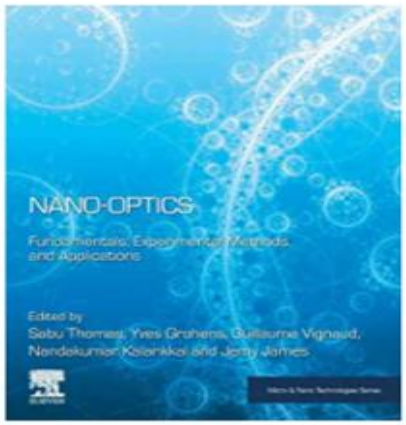




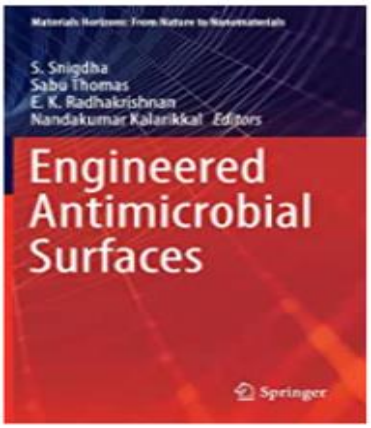


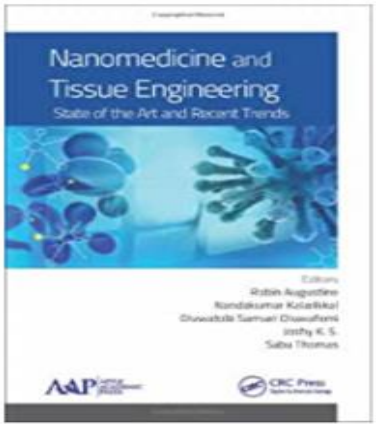




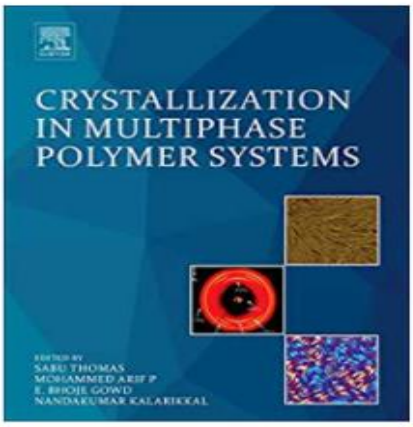

NANO-OPTICS
Fundamentals, Experimental Methods, and Applications
Edited by
Sabu Thomas, Yves Grohens, Guillaume Vignaud, Nandakumar Kalarikkal and Jemy James

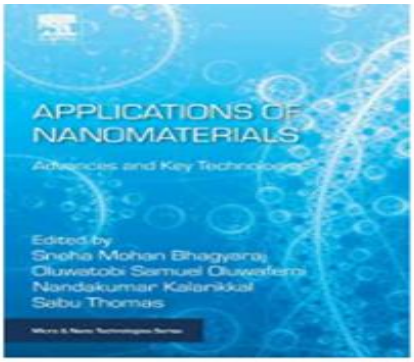

Advanced Polymeric Systems
Applications in Nanostructured Materials, Composites and Biomedical Fields


S. Snigdha
Sabu Thomas
E. K. Radhakrishnan
Nandakumar Kalarikkal Editors
Engineered Antimicrobial Surfaces
Springer

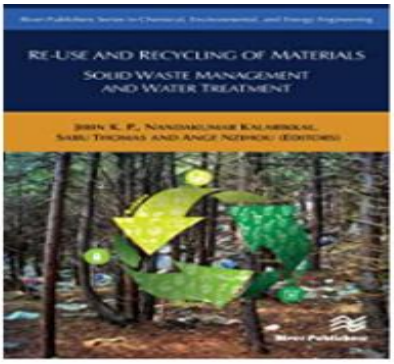

Nanomedicine and Tissue Engineering
State of the Art and Recent Trends

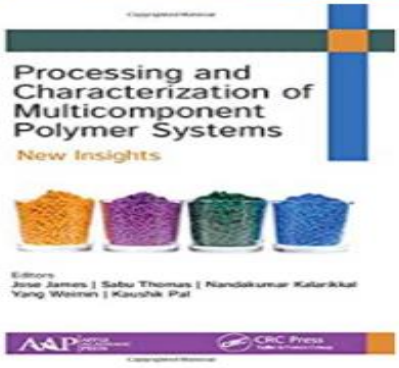

Biomaterial Applications
Macro to Nanoscales

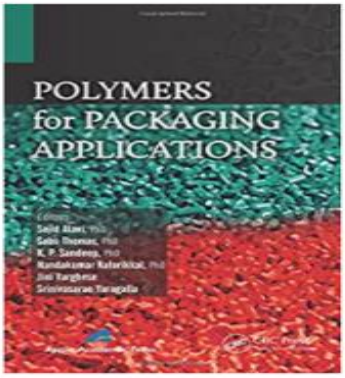

CRYSTALLIZATION IN MULTIPHASE POLYMER SYSTEMS

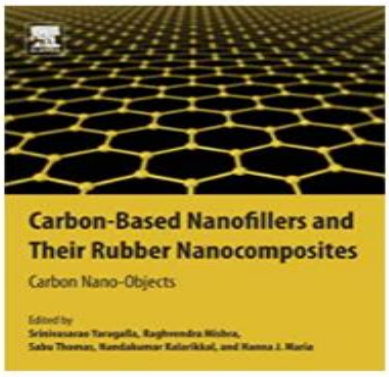

APPLICATIONS OF NANOMATERIALS
Advances and Key Technologies
Edited by
Sneha Mohan Bhagyaraj
Oluwatobi Samuel Oluwafemi
Nandakumar Kalarikkal
Sabu Thomas

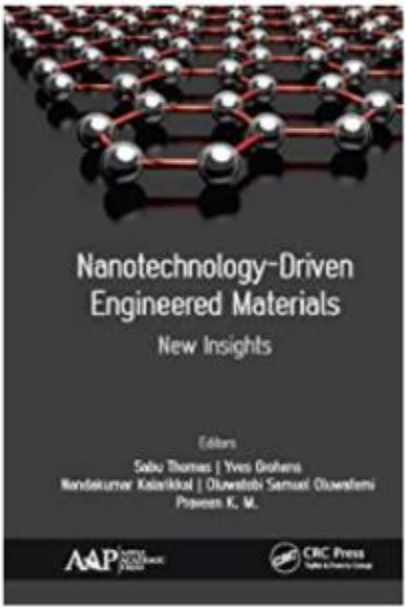

Innovative Food Science and Emerging Technologies
The Science Behind Health

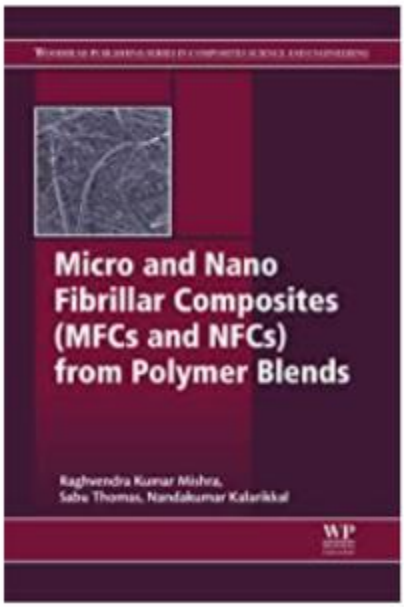

RE-USE AND RECYCLING OF MATERIALS
SOLID WASTE MANAGEMENT AND WATER TREATMENT


Processing and Characterization of Multicomponent Polymer Systems
New Insights


POLYMERS for PACKAGING APPLICATIONS


Carbon-Based Nanofillers and Their Rubber Nanocomposites
Carbon Nano-Objects





M. Sc. & M. Phil. Theses guided

- X-ray diffraction studies on KTP crystals- M. Sc thesis (1994)
- Dielectric and heat capacity studies on selected Tungsten Bronze Ferroelectric Ceramics M. Phil thesis (1996)
- X-ray diffraction studies on selected Barium Sodium Niobate ceramics- M. Phil thesis (1998)
- X-ray diffraction studies on $Sr_{1-x}Ba_xNb_2O_6$ ceramics- M. Sc thesis (1998)
- Photoluminescence of Barium Modified Strontium Cerate-M. Sc thesis (2003)
- Synthesis and characterization of Gd^{3+} modified Sr_2CeO_4 ceramic phosphor- M. Phil thesis (2004)
- Sol-gel synthesis and structural characterization of Nano Nickel Ferrite systems- M. Phil thesis (2005)
- Synthesis and Characterization of $(Sr_xBa_{1-x})_2 CeO_4$ ceramic phosphors-M. Phil thesis (2006)
- Synthesis and investigation of structural phase transition in Strontium Barium Niobate Ceramics- M.Phil thesis (2006)
- Sol-gel synthesis, structural and nonlinear optical characterizations of nanomultiferroic Yttrium Ferrite-M. Phil thesis (2009)
- Synthesis, structural and thermal characterization of Sol-gel derived nanomultiferroic YFe_2O_4-M.Phil thesis (2009)
- Synthesis and characterization of Cd_xZn_{1-x} quantum dots-M. Sc thesis (2010)
- Synthesis and investigations on Lithium Sodium Niobate Nanoferroelectics-M. Phil thesis (2010)
- Copper LASER plasma generation and characterization- M. Phil thesis (2010)
- Synthesis and investigations on Cobalt-Zinc Nanoferrites- M. Phil thesis (2010)
- Synthesis and characterization of Zinc Oxide Nanoparticles-M. Phil thesis (2011)
- Design, synthesis and characterization of Phospholipid-Silver nanoconjugates for

biomedical applications- M. Phil thesis (2012)

- Nanocrystaline multiferroic $Bi_{1-x}Pr_xFe_2O_3$(X=0,0.3) systems studied by different characterization techniques and positron annihilation spectroscopy-M. Sc thesis (2013)
- Investigations of multiferroic core-shell nanostructures-M. Phil thesis (2014)
- Dynamics of Plasma Plume during LASER ablation of metal targets in ambient air and stationary liquid media-M. Phil thesis (2014)
- Development of Silver Nanoparticles Decorated Graphene Quantum Dots for Tailored Applications-M. Phil thesis (2018)
- Engineered Molybdenum Disulphide hybrid nanostructures for water splitting and waste water treatment Applications-M. Phil thesis (2019)
- Novel Synthesis of Graphene, Vertical Graphene and Graphene Quantum Dots by Laser Ablation Technique-M. Phil thesis (2019)
- Silver Nanowire Decorated Cobalt Oxide Nano-cone Array for Gas Sensing Applications- M. Phil thesis (2019)
- Engineered Nanohybrid TiO_2 decorated MoS_2 Microspheres for Waste Water Treatment Applications under Solar Irradiance-M. Phil thesis (2019)
- Pristine, Single atom and Hetero atom Doped Reduced Graphene Oxide for Dye Detection-M. Phil thesis (2019)
- Study of Urea Oxidation Electrocatalysis using Mn doped Ni-Co Oxide Catalysts-M. Phil thesis (2020)
- Sensing of Biomolecules (Catechol and Nitrobenzene) by Two Dimensional MoS_2 and C_{18} Cyclocarbon: Insights from First principle Density Functional Theory Simulation-M. Phil thesis (2020)

Ph. D. Theses guided

Titles of Ph. D theses supervised

1. Metal oxide based hybrid nanostructures for water purification-Shabina Kappadan-Thesis submitted (**2020**)
2. Development and characterization of engineered metal and metal oxide nanoparticle/ cluster polymer composite for prosthodontic application-Dr. Sandhya Gopalakrishnan (**2019**)
3. Dietary Supplements and Nutraceutical formulations-Rajakumari R **(2019)**
4. Studies on Electrospun Chitosan and its Composites-Merin Sara Thomas (**2019**)
5. Electroactive polymer ceramic nanocomposites for multifunctional applications- Anshida Mayeen (**2018**)
6. Synthesis and characterizations of metal and metal oxide nano particle cluster polymer composites for their uses in craniofacial prosthesis and prosthodontic and dental applications-Dr. Indu Raj (**2018**)
7. Recyled polyurethane toughened epoxy resin-Arunima R (**2018**)
8. Development of Hybrid Multiferroic Materials for Tailored Applications-Ann Rose Abraham (**2018**)
9. Polyhedral Oligmeric Silsesquioxane (POSS) Filled Natural Rubber Composites-Lakshmipriya S (**2018**)

10. Graphene and Carbon Nano tube Reinforced Elastomer Nanocomposites, Srinivasarao Yaragalla (**2016**)
11. Graphene Based Hybrid Materials for Tailored Applications-El Hadji Mamour Sakho (International student) (**2016**)
12. Investigation on Nano sized Multiferroic $BiFeO_3$ $NaNbO_3$ ceramics and its polymer composites-Rehana P Ummer (**2016)**
13. Design and development of polymer nanocomposites for biomedical applications-Robin Augustine (**2015)**
14. Synthesis and characterisation of selected nanomultiferroic systems-Raneesh B (**2013)**
15. Multifunctional studies on pure and Fe modified Yttrium chromite nanosystems -Shiji Krishnan (**2013)**
16. Investigations on selected nanomagnetic systems-Jeevan Job Thomas (**2012)**
17. Preparation and characterization of selected luminescent nanoparticles-Nuja S John **(2012)**
18. Multifunctional studies on pure and Fe modified Yttrium Chromite nanosystems -Seema R **(2011)**
19. Investigations on structural and electrical properties of selected ferroelectric ceramics-Jaimon Yohannan **(2001)**

Titles of Ph. D theses co-supervised

1. Nanoparticles for Improved Plant growth and secondary metabolite production-Rakhimol K. R-Thesis submitted (**2020**)
2. Investigations on Ag/TiO_3/GQD Nanoparticles based PMMA-polymer nanocomposites for multifunctional Applications -Bhavitha K B-Thesis submitted (**2020**)
3. Role of Multiwall Carbon Nanotubes on the Morphology, Rheology and Properties of Natural Rubber/Polypropylene Blends-Sharika T Nair (**2019**)
4. Studies on Electrospun Chitosan and its Composites-Merin Sara Thomas (**2019**)
5. Microbiological Application of Nanostructured Materials-Snigdha S (**2019**)
6. Development of carbon nanotube based polymer blend nanocomposites for electromagnetic interference shielding- P Mohammed Arif (**2018**)
7. Study on Polyvinyl Chloride/Graphene Nanocomposites-Akhina H (**2018**)
8. Noble metal nanostructures and hetero atom doped graphene hybrids for multifunctional applications-Anju K. Nair **(2017)**
9. Ionic liquid modified carbon nanotube based styrene butadiene rubber nanocomposites-Jiji Abraham **(2017)**

Conferences/Workshops/Seminars Convened: 30

Membership in Professional bodies

- The Indian Physics Association- Life Membership
- Plasma Science Society of India-Life Membership

Other information

- External examiner for M. Sc, M. Phil and Ph. D theses evaluator for various Universities in India and abroad.
- Resource person for many workshops, conferences and seminars organized by different colleges, refresher courses, national and international workshops/conferences organized by School of Pure and Applied Physics, International and Inter University Centre for Nanoscience and Nanotechnology of Mahatma Gandhi University and other institutions in India and abroad.
- Reviewer for many international journals.

Hobbies

Music, nature, classical art forms, books, movies, travel, photography, videography, cooking, gardening and bird watching