



Dr. Nandakumar Kalarikkal

Associate Professor

Advanced Materials Laboratory

School of Pure and Applied Physics

Mahatma Gandhi University, Kottayam - 686 560, Kerala, India

nkkalarikkal@mgu.ac.in, drkalarikkal@gmail.com

Telephone: +91-9447671962 (Mobile), +91-481-2731043, +91-481-2731669 (Office/Fax)



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

Recognition

1. 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-2016
2. Visiting Fellow, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, India
3. Visiting Fellow, Gulbarga University, Gulbarga, Karnataka under SAP scheme of UGC

4. Visiting Professor, Alemaya University (1998-2002) & Mekkele University (2006-2007), Ethiopia
5. Conference Fellowship Award of the Seventh International Conference on Phonon Scattering in Condensed Matter held at Cornell University, USA
6. Research Associate Fellowship from DST & CSIR, Govt. of India (1992)
7. Senior Research Fellowship from CSIR, Govt. of India (1990)
8. 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 synthesis, characterization and applications of various nanomaterials, ion irradiation effects on various novel materials and phase transitions. The different topics of current research works are:

- **Nanomultiferroics**
- **Nanosemiconductors and Nanophosphors**
- **Nanocomposites**
- **Nanoferroelectrics**
- **Nanoferrites**
- **Nanomedicine**
- **Nanosensors**
- **Polymer nanocomposites**
- **Ion beam irradiation effects & Phase transitions**
- **Laser Ablation, Pulsed Laser Deposition (PLD) of thin films and Nonlinear Optics using Nd-YAG Laser**

Facilities available

A very good wet chemistry synthesis laboratory with major infrastructure facilities such as Furnaces, Centrifuges, Magnetic stirrers, pH meters, Hot air ovens, Microwave oven, Pelletizer, Ultrasonicator and Spin Coaters etc.

For experimental characterizations, Dielectric and resistivity measurement facilities from 77K to 773K, UV-Vis-NIR spectrophotometer, Spectrophotofluorimeter with life time measurement facility, X-ray diffractometer, ME coupling measurement unit, Differential Scanning

Calorimeter, Laser Ablation and Z-scan set up with Nd-YAG laser, HRTEM, AFM are available.

Facilities like Confocal Raman with AFM, FTIR, SEM, TGA/DTA etc. are also available as central facilities of the University.

Number of Ph. Ds Guided: 9

Number of M. Phil and M. Sc. Theses Guided: 25

Total Number of Publications: 120

Patents

Link: <https://www.youtube.com/watch?v=q9vOwJBpBaQ>

List of publications (2016)

1. Evaluation of in-vitro cytotoxicity and cellular uptake efficiency of zidovudine-loaded solid lipid nanoparticles modified with Aloe Vera in glioma cells, K S Joshy, CP Sharma, **N Kalarikkal**, K Sandeep, S Thomas, LA Pothan, **Materials Science and Engineering: C** **66**, 40-50 (2016)
2. Tetragonal BaTiO₃ nanoparticles: An efficient photocatalyst for the degradation of organic pollutants, S Kappadan, TW Gebreab, S Thomas, **N Kalarikkal**, **Materials Science in Semiconductor Processing** **51**, 42-47 (2016)
3. Preparation and characterization of green graphene using grape seed extract for bioapplications, S Yaragalla, R Rajendran, J Jose, MA AlMaadeed, **N Kalarikkal**, S Thomas, **Materials Science and Engineering: C** **65**, 345-353 (2016)
4. Nonlinear optical properties of (1-x) CaFe₂O₄-xBaTiO₃ composites, T Woldu, B Raneesh, P Sreekanth, MVR Reddy, R Philip, **N Kalarikkal**, **Ceramics International** **42** (9), 11093-11098 (2016)
5. Surface Acoustic Wave Device with Reduced Insertion Loss by Electrospinning P (VDF-TrFE)/ZnO Nanocomposites, R Augustine, F Sarry, **N Kalarikkal**, S Thomas, L Badie, D Rouxel **Nano-Micro Letters**, 1-9 (2016)
6. Magnetic response of superparamagnetic multiferroic core-shell nanostructures AR Abraham, B Raneesh, D Das, **N Kalarikkal**, **DAE SOLID STATE PHYSICS SYMPOSIUM 2015** -1731 (1), 050151 (2016)
7. Ultrasensitive detection of a 1-pyrenecarboxylic acid by surface enhanced Raman scattering hot spot with reduced graphene oxide/silver nanoparticles composites, El hadji Mamour Sakho, OS Oluwafemi, ASaha, S Thomas, **N Kalarikkal**, **Materials Letters** **171**, 137-141 (2016)
8. Gentamicin loaded electrospun poly (ϵ -caprolactone)/TiO₂ nanocomposite membranes with antibacterial property against Methicillin resistant Staphylococcus aureus (MRSA), R Augustine, SC George, **N Kalarikkal**, S Thomas, **Polymer-Plastics Technology and Engineering** **1**, (2016)
9. Cell adhesion on polycaprolactone modified by plasma treatment, N Recek, M Resnik, H Motaln, T Lah-Turnšek, R Augustine, **N Kalarikkal**, S Thomas, **International Journal of Polymer Science**, 1-9 (2016)

10. Clogging-Free Electrospinning of Polycaprolactone Using Acetic Acid/Acetone Mixture
R Augustine, N Kalarikkal, S Thomas, **Polymer-Plastics Technology and Engineering** **55** (5), 518-529 (2016)
11. Electrospun PCL membranes incorporated with biosynthesized silver nanoparticles as antibacterial wound dressings, R Augustine, N Kalarikkal, S Thomas, **Applied Nanoscience** **6** (3), 337-344 (2016)
12. Completely green synthesis of silver nanoparticle decorated MWCNT and its antibacterial and catalytic properties, S Mohan, OS Oluwafemi, SP Songca, D Rouxel, P Miska, FB Lewu, N Kalarikkal, Sabu Thomas, **Pure and Applied Chemistry** **88** (1-2), 71-81 (2016)
13. Synthesis, antibacterial, cytotoxicity and sensing properties of starch-capped silver nanoparticles, S Mohan, OS Oluwafemi, SP Songca, VP Jayachandran, D Rouxel, N Kalarikkal, Sabu Thomas, **Journal of Molecular Liquids** **213**, 75-81 (2016)
14. Structural and optical properties of functionalized multi-walled carbon nanotubes, S Yaragalla, G Anilkumar, N Kalarikkal, S Thomas, **Materials Science in Semiconductor Processing** **41**, 491-496 (2016)
15. Effect of zinc oxide nanoparticles on the in vitro degradation of electrospun polycaprolactone membranes in simulated body fluid, R Augustine, N Kalarikkal, S Thomas, **International Journal of Polymeric Materials and Polymeric Biomaterials** **65**, 1, (2016)
16. Developing highly conducting and mechanically durable styrene butadiene rubber composites with tailored microstructural properties by a green approach using ionic liquid modified MWCNTs, J Abraham, L Kailas, N Kalarikkal, SC George, S Thomas, **RSC Advances** **6** (39), 32493-32504 (2016)
17. Electric, magnetic, piezoelectric and magnetoelectric studies of phase pure (BiFeO₃-NaNbO₃)-(P (VDF-TrFE)) nanocomposite films prepared by spin coating, R P Ummer, B Raneesh, C Thevenot, D Rouxel, S Thomas, N Kalarikkal, **RSC Advances** **6** (33), 28069-28080 (2016)
18. Grain size dependent magnetoelectric coupling of BaTiO₃ nanoparticles, T Woldu, B Raneesh, MVR Reddy, N Kalarikkal, **RSC Advances** **6** (10), 7886-7892 (2016)
19. Nonlinear transmittance and optical power limiting in Magnesium ferrite nanoparticles: effects of laser pulsewidth and particle size, P Sreekant, Kishore Sridharan, Ann Rose Abraham, Harsha P Janardhanan, Nandakumar Kalrikkal, Reji Philip, **RSC Adv.**, DOI: 10.1039/C6RA15788B (2016)
20. Microwave Absorption in MWNTs-Based Soft Composites Containing Nanocrystalline Particles as Magnetic Core and Intrinsically Conducting Polymer as a Conductive Layer, V Bhingardive, T Woldu, S Biswas, GP Kar, S Thomas, N Kalarikkal, S Bose, **Chemistry Select** **1** (15), 4747-4752 (2016)
21. Improved nonlinear optical and optical limiting properties in non-covalent functionalized reduced graphene oxide/silver nanoparticle (NF-RGO/Ag-NPs) hybrid, El haji Mamour Sakho, OS Oluwafemi, P Sreekanth, R Philip, S Thomas, N Kalarikkal **Optical Materials** **58**, 476-483 (2016)
22. Rheology and Processing of Inorganic Nanomaterials and Quantum Dots/Polymer Nanocomposites, S Mohan, J Abraham, OS Oluwafemi, N Kalarikkal, S Thomas **Rheology and Processing of Polymer Nanocomposites**, 355-382 (2016)
23. Experimental investigation of optical and magneto optical effects of chemically synthesized cobalt nanocolloids, F Parakkal, B Babukutty, BA Vettiyadan, N Kalarikkal, SS Nair, **Materials Research Express** **3** (4), 045020 (2016)

24. Nylon 6, 12/Cloisite 30B Electrospun Nanocomposites for Dental Applications
SS Babu, A Augustine, **N Kalarikkal**, S Thomas, **Journal of Siberian Federal University. Biology** 9 (2), 198 (2016)
25. Nonlinear transmittance and optical power limiting in Magnesium ferrite nanoparticles: effects of laser pulsewidth and particle size, Sreekanth Perumbilavil, Kishore Sridharan, Ann Rose Abraham, Harsha P J anardhanan, **Nandakumar Kalarikkal** and Reji Philip, **RSC Advances**, DOI: 10.1039/C6RA15788B (2016)
26. Rapid and facile synthesis of graphene oxide quantum dots with good linear and nolinear optical properties, El hadji Mamour Sakho, Oluwatobi S. Oluwafemi, Sreekanth Perumbilavil, Reji Philip, Kala M S, Sabu Thomas and **Nandakumar Kalarikkal**,
J. Mater Sci: Mater Electron, DOI 10.1007/s10854-016-5204-z (2016)
27. Dynamic energy transfer in non-covalently functionalized reduced graphene oxide/silver nanoparticle hybrid (NF-RGO/Ag) with NF-RGO as the donor material, El Hadji Mamour Sakho, Oluwatobi S. Oluwafemi, Sabu Thomas and **Nandakumar Kalarikkal**, J Mater Sci: Mater Electron, DOI 10.1007/s10854-016-5842-1.
28. Electrochemical studies on composite gel polymer electrolytes for lithium sulfur-batteries, Angulakshmi Natarajan, Arul Manuel Stephan, Chin Han Chan, Nandakumar Kalarikkal, Sabu Thomas, J. Appl. Polymer Sciences, DOI: 10.1002/app.44594 (2016)
29. Enhanced photocatalytic performance of ZnO nanostructures produced via a quick microwave assisted route for the degradation of rhodamine in aqueous solution, RM Thankachan, N Joy, J Abraham, **N Kalarikkal**, S Thomas, **Materials Research Bulletin**, 85, 131-139 (2017)
30. A comparative study on structural, dielectric and multiferroic properties of $\text{CaFe}_2\text{O}_4/\text{BaTiO}_3$ core-shell and mixed composites, T Woldu, B Raneesh, BK Hazra, S Srinath, P Saravanan, MVR Reddy, **N Kalarikkal**, **Journal of Alloys and Compounds** 691, 644-652 (2017)
31. Boron doped graphene wrapped silver nanowires as an efficient electrocatalyst for molecular oxygen reduction, Anju K Nair, Vineesh T.V, Rakesh Joshi, Veena Sahajwalla, Kala M.S, Sabu Thomas, S. Alwarappan, **Nandakumar Kalarikkal**, **Nature Scientific Reports- Accepted manuscript**

Books edited 2016

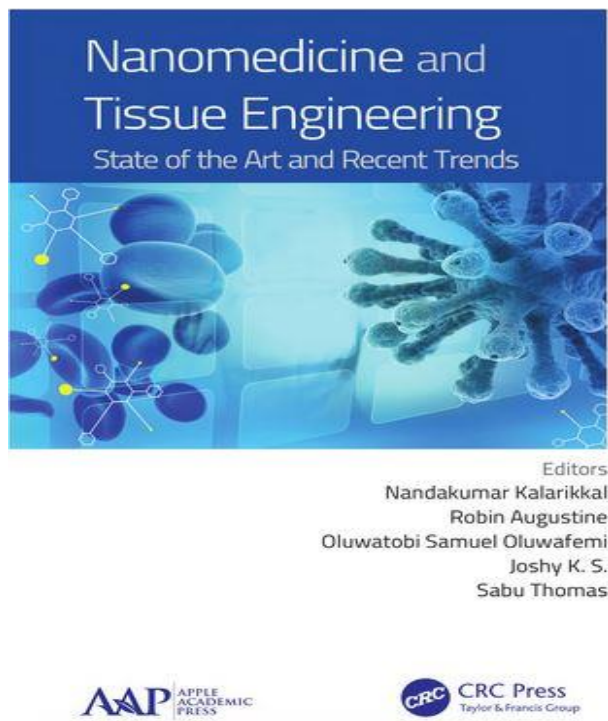
1. Nanomedicine and Tissue Engineering: State of the Art and Recent Trends
CRC Press
Nandakumar Kalarikkal, Robin Augustine, Oluwatobi Samuel Oluwafemi, Joshy K. S., Sabu Thomas
March 2016, ISBN 9781771881180
2. Advanced Polymeric Materials: From Macro-to Nano-Length Scales
CRC Press
Sabu Thomas, Nandakumar Kalarikkal, Maciej Jaroszewski, Josmine P. Jose
ISBN 9781771880961 - CAT# N11232

1. 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
2. TISSUE ENGINEERING: PRINCIPLES, RECENT TRENDS AND THE FUTURE
AP MATHEW, R AUGUSTINE, N KALARIKKAL, S THOMAS
Nanomedicine and Tissue Engineering: State of the Art and Recent Trends, 31-82, 2016,
ISBN 9781771881180
3. ELECTROSPUN MATRICES FOR BIOMEDICAL APPLICATIONS: RECENT
ADVANCES
DP MOHANAN, R AUGUSTINE, N KALARIKKAL, EK RADHAKRISHNAN, ...
Nanomedicine and Tissue Engineering: State of the Art and Recent Trends, 365-390
ISBN 9781771881180
4. POLYURONATES AND THEIR APPLICATION IN DRUG DELIVERY AND
COSMETICS
R AUGUSTINE, SS BHAVANAVENUGOPAL, N KALARIKKAL, S THOMAS
Green Polymers and Environmental Pollution Control, 239-269
5. BIOPOLYMERS – APPLICATION IN NANOSCIENCE AND NANOTECHNOLOGY
Sneha Mohan, Oluwatobi S. Oluwafemi, Nandakumar Kalarikkal,
Sabu Thomas and Sandile P. Songca (2016). Biopolymers – Application in Nanoscience and
Nanotechnology, Recent Advances in Biopolymers, Dr. Farzana Khan (Ed.), InTech, DOI:
10.5772/62225. Available from: <http://www.intechopen.com/books/recent-advances-in-biopolymers/biopolymers-application-in-nanoscience-and-nanotechnology>
6. 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)**
7. 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

Books Edited

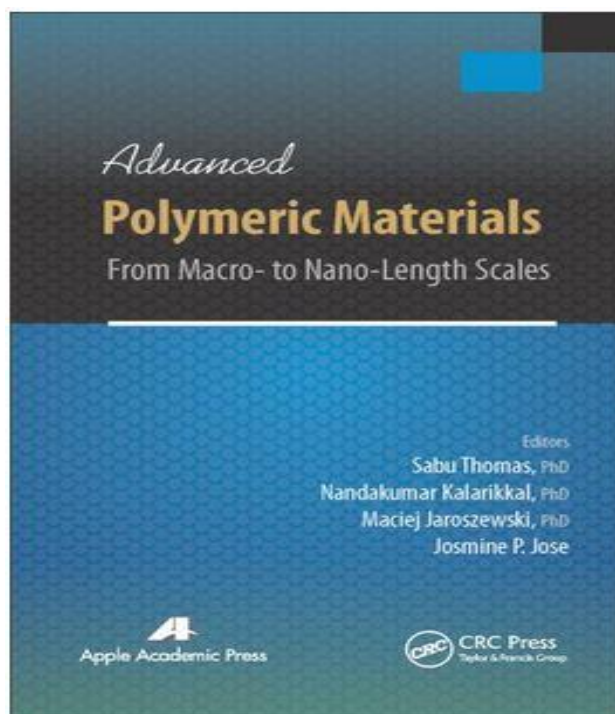
1. Nanomedicine and Tissue Engineering: State of the Art and Recent Trends

CRC Press, Nandakumar Kalarikkal, Robin Augustine, Oluwatobi Samuel Oluwafemi, Joshy, K. S., Sabu Thomas, March 2016, ISBN 9781771881180



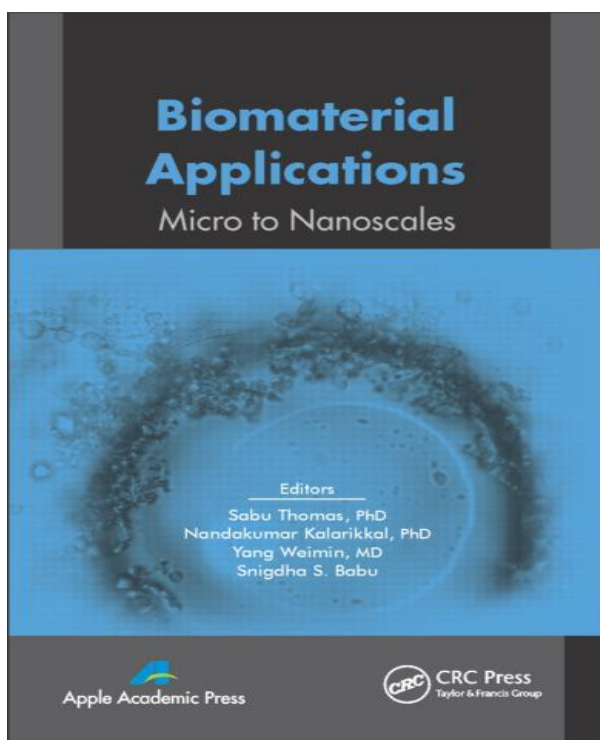
2. Advanced Polymeric Materials: From Macro-to Nano-Length Scales

CRC Press, Sabu Thomas, Nandakumar Kalarikkal, Maciej Jaroszewski, Josmine P. Jose, ISBN 9781771880961 - CAT# N11232



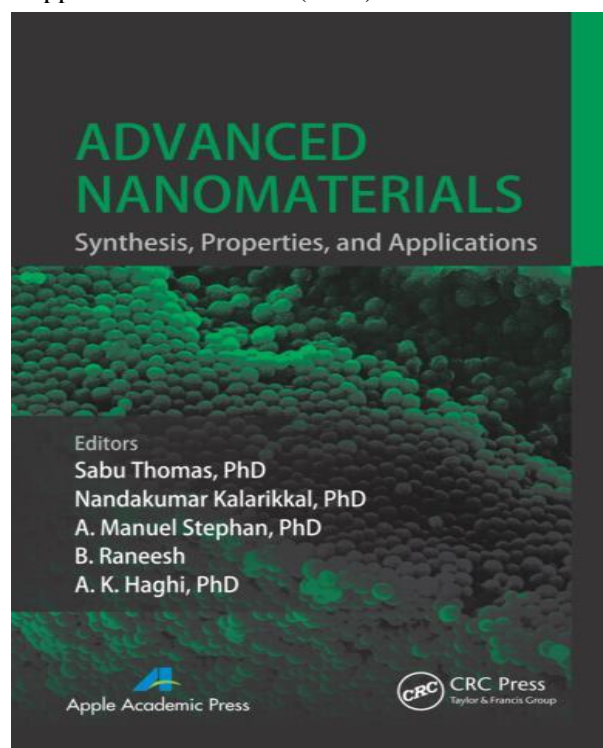
3. Biomaterial Applications: Macro to Nanoscales,

Editors: Sabu Thomas, Nandakumar Kalarikkal, Yang Weimin, Snigdha S Babu. Apple Academic Press (2014)

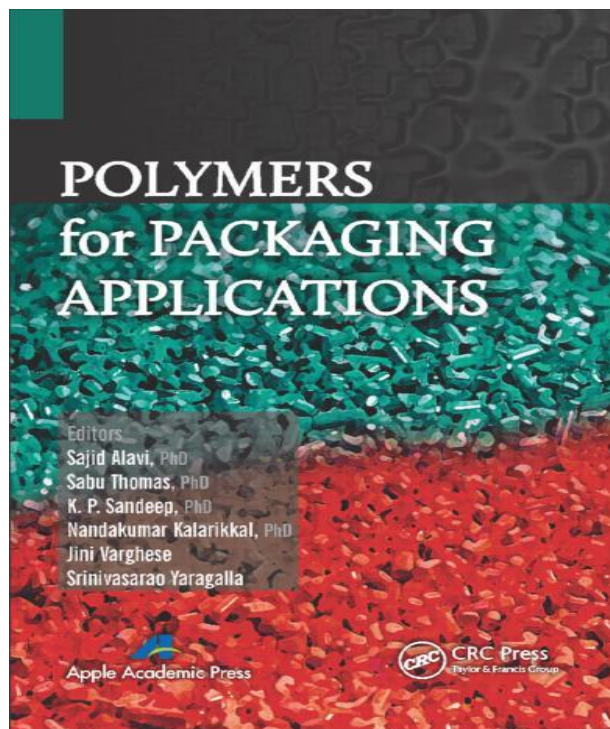


4. Advanced in Nanomaterials: Synthesis, Properties, and Applications

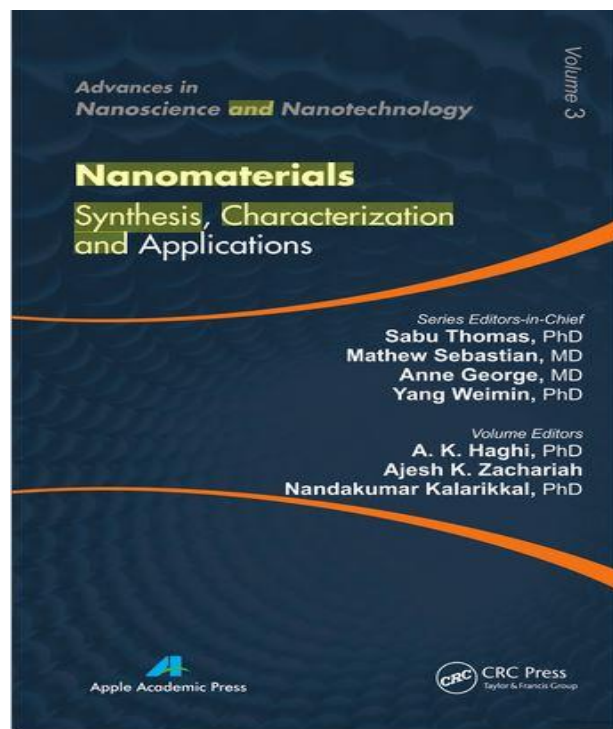
Editors: Sabu Thomas, Nandakumar Kalarikkal, A. Manuel Stephan, B. Raneesh, and A.K Haghi. Apple Academic Press (2015)



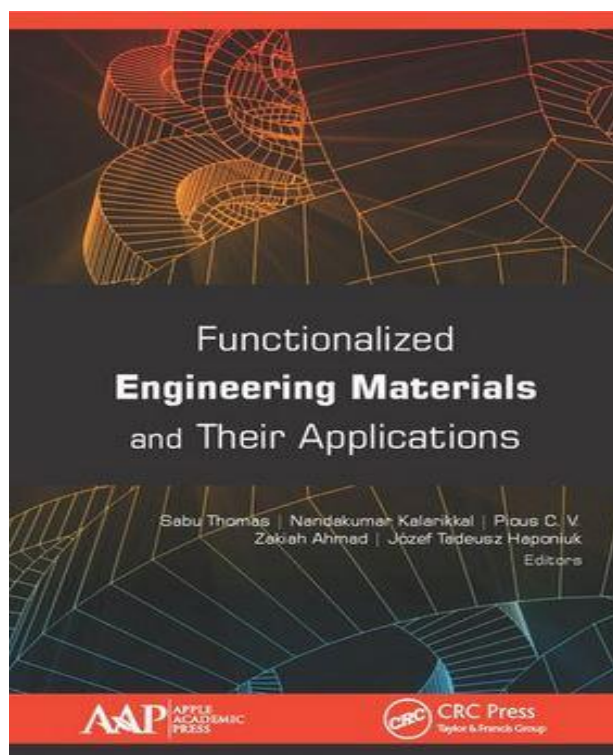
5. **Polymers for Packaging Applications**,
Editors: Sabu Thomas, Sajid Alavi, Jini Varghese,
Nandakumar Kalarikkal, and Oluwatobi Samuel
Oluwafemi, CRC Press (2014)



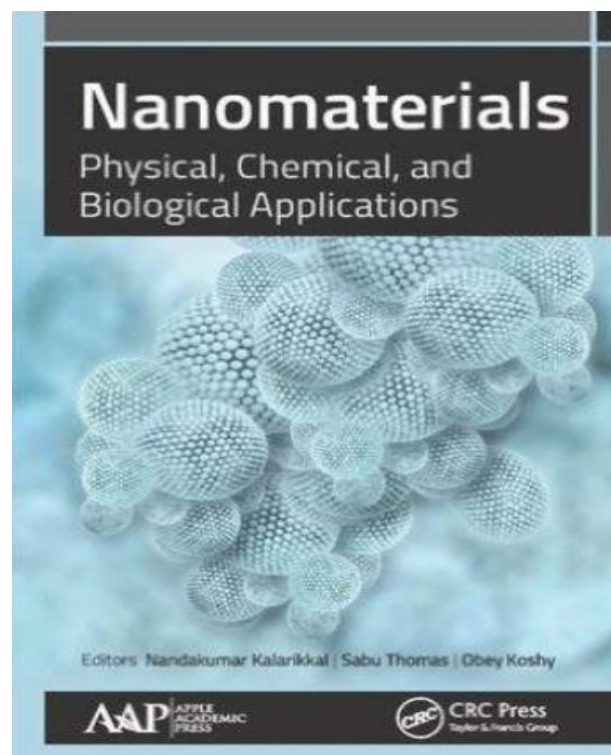
6. **Nanomaterials: Synthesis, Characterization, and Applications, Volume 3**
Advances in Nanoscience and Nanotechnology book series, Editors: A. K. Haghi, Ajesh K. Zachariah,
Nandakumar Kalarikkal (2013)



7. **Functionalized Engineering Materials and Their Applications**,
Editors: Sabu Thomas, **Nandakumar Kalarikkal**,
Jozef Tadeusz Haponiuk, Zakiah Ahmad, Apple
Academic Press, Incorporated, 15-Nov-2016

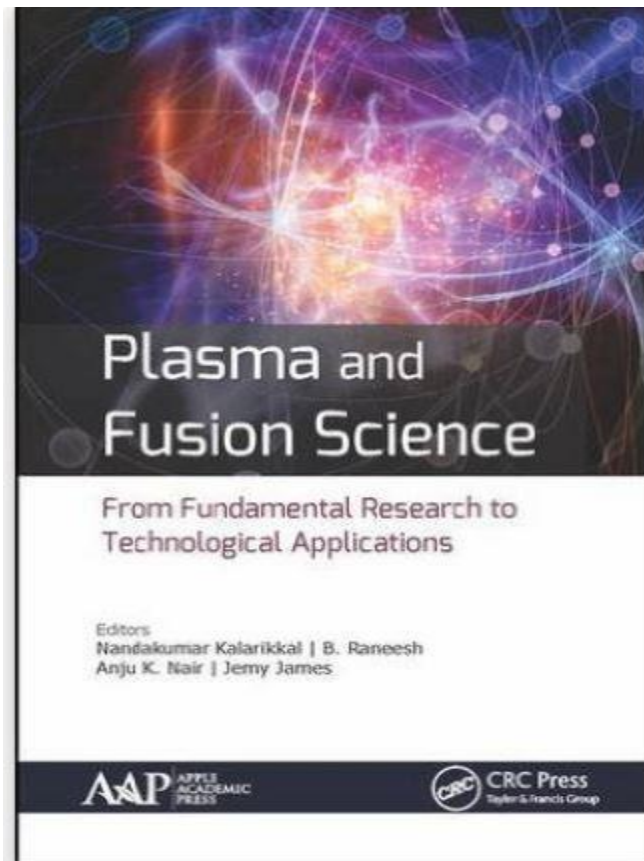


8. **Nanomaterials, Physical, Chemical, and Biological Applications**,
Editors: **Nandakumar Kalarikkal**, Sabu Thomas, Obey
Koshy, Forthcoming by Apple Academic Press



9. Plasma and Fusion Science: From Fundamental Research to Technological Applications

Editors: B. Raneesh, **Nandakumar Kalarikkal**,
Jemy James, Anju K. Nair , Apple Academic Press
(20 November 2016)



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
- Cape-Peninsula University of Technology, South Africa
- Université de Bretagne Sud, France
- Jožef Stefan Institute, Ljubljana, Slovenia
- Trent University, Canada
- Johannesburg University, Johannesburg, South Africa
- FRE CNRS 3744, IRDL, Univ. Bretagne Sud, F-56100 Lorient, France
- Institute of Plasma Research, Gandhinagar, Gujarat, India
- Deakin University, Australia
- Institut Jean Lamour-UMR 7198 CNRS-Université de Lorraine, France
- Kansas State University, Manhattan, KS-66506, USA
- Pushpagiri Medical Society, Thiruvalla, Kerala

Research Group

1. Prof. Sabu Thomas, Director, IIUCNN
2. Dr. Geethamma. V. G, Assistant Professor, IIUCNN
3. Dr. M. S. Latha, Assistant Professor, IIUCNN
4. Dr. Raji. V, Assistant Professor, IIUCNN
5. Dr. Kala M. S, St. Theresa's College, MGU
6. Dr. Angulakshmi, Post-Doctoral Fellow, IIUCNN
7. Dr. Praveen G, Post-Doctoral Fellow, IIUCNN
8. Dr. Jiya Jose, Post-Doctoral Fellow, IIUCNN
9. Dr. Obey Koshi, Post-Doctoral Fellow, IIUCNN
10. Dr. Ajithkumar M. P, Post-Doctoral Fellow, IIUCNN
11. Ms. Rajakumari (Nanomedicine/Nanopharmaceutics)
12. Dr. El Haji Mamor (Grapheme hybrid structures)-International Student
13. Ms. Rehana P Ummer (Multiferroic nano/composites)
14. Ms. Lakshmi Priya (Polymer nanocomposites)
15. Ms. Arunima (Polymer nanocomposites)
16. Ms. Anju Nair (Ag-Hybrid structures for Bio-sensing applications and Bio-glass)
17. Ms. Bhavita (Aggregation behavior of nanoparticles)
18. Dr. Sandhya Gopalakrishnan (Polymer nanocomposites for denture application)
19. Dr. Indu Vinod (Polymer nanocomposites for denture application)
20. Mr. Jemy James (Polymer nanocomposite)
21. Ms. Shabina Kappadan (Polymer nanomembranes for catalysis)
22. Mr. Ms. Anshita Mayeen (Energy harvesting structures)
23. Ms. Parvathy (Laser Plasma/Plasma Dynamics)
24. Mr. Ashin Shaji (Pulsed Laser Deposition/Multiferroics)
25. Ms. Praveena Malliyil (Multiferroics/Complex metal oxides for water purification)

Previous Group Members

- Dr. Jaimon Yohannan (Ferroelectrics)
- Dr. Seema R Nair (Nanophosphors)
- Dr. Nuja S John (Nanoferroelectrics)
- Dr. Jeevan Job Thomas (Nanoferrites)
- Dr. Shiji Krishnan (Multiferroics)
- Dr. Raneesh Balakrishnan (Multiferroics)
- Dr. Sneha P Mohan (Core-shell quantum dots and Polymer nanocomposites)
- Dr. Tesafikaros Woldu (Nanomultiferroics)-International Student
- Dr. Sreenivasa Rao (Carbon structures based polymer nanocomposites)
- Dr. Robin Augustine (Polymer nanocomposite membranes for tissue engineering)
- Dr. Kajal, Post-Doctoral Fellow, IIUCNN
- Ms. Elaheh Allahyari-International student

Research Grants

- Irradiation effects on the structural and electrical properties of selected ferroelectric ceramics, NSC-UFUP project-IAC-Govt. of India-(**Principal Investigator**)-Completed
- Nano Materials: Synthesis, characterization and applications, DST, New Delhi (**Principal Co-Investigator**)-Completed

- 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
- Development of engineered nano-structured materials for high performance applications-DST-Nano Mission-Govt. of India-**(Principal Co-Investigator)**-Completed
- 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
- 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-**On going**-(**Project Co-Investigator**)
- Nanoparticle aggregation behavior in polymer nanocomposites- UGC-DAE-CSR Kolkata Centre Project-**On going** -(**Principal Investigator**)
- Development of one dimensional multiferroic nanocomposites for device applications” under the SRS scheme- KSCSTE-Govt. of Kerala- **On going** -(**Principal Investigator**)
- Physics of Cavitation Bubbles and Hydrogen Generation during Liquid Phase Laser Ablation-BRNS/BRFST-DAE-Govt. of India- **On going** -(**Principal Investigator**)
- Design and applications of magnetically responsive self-assembled polymer nanocomposites, DST-Nano Mission-Govt. of India- **Approved**-(**Principal Investigator**)
- Biobased scaffolds, membranes and hydrogels for improved wound healing and bone regeneration (**BIOHEAL**)-International project-**Swedish Research Links**-(**Indian Collaborator**)-**Approved**

Conferences/Workshops convened

1. Fourth International Conference on Polymer Processing and Characterization (ICPPC – 2016) on 9 - 11 December 2016
2. Second International Conference on Advanced Materials for Power Engineering(ICAMPE 2016) : 11-13, November 2016
3. Fourth International Conference on Nanomedicine and Tissue Engineering (ICNT 2016) : 12-14 August 2016
4. International Conference on Macromolecules: Synthesis, Morphology, Processing, Structure, Properties and Application (ICM 2016): 13-15, May 2016

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 and seminars organized by different colleges, refresher courses and national and international workshops/conferences organized by School of Pure and Applied Physics, Centre for Nanoscience and Nanotechnology of Mahatma Gandhi University and other institutions in India and abroad. Reviewer for many international journals.

Membership in Professional bodies

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

Hobbies

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

Link: <http://cnnmgu.blogspot.in/2013/05/dr-nandakumar-kalarikkal-talks.html>