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EDUCATIONAL QUALIFICATION:

- **April 2015** *Doctoral Degree in Material Science* from Deakin University, Australia

Doctoral Thesis: Development of High Performance Materials based on Smart Elastomer Nanocomposites

- **Dec 2006**- Qualified *National Eligibility Test* conducted by CSIR, India
- **June 2006:** *Master of Science in Chemistry* (Second Rank, 82.05%), University of Kerala, Kerala, India.
- **June 2004:** *Bachelor Degree in Chemistry*, (85.7%) University of Kerala, Kerala, India

VISITING STUDENT

Apr 2013-Oct 2013: Centre for Advanced Materials, Qatar University, Doha, Qatar

Sep 2012-Oct 2012: Indira Gandhi Centre for Atomic Research, Kalppakkam, Tamil Nadu, India.

Sept 2011-May 2012: School of Chemical and Biological Engineering, Seoul National University, South Korea.

AWARDS

- 1) **Best Oral Presentation Award** in “National Conference on Nanostructured materials and Nanocomposites (NCNM) 2012” Sponsored by UGC, at NSS College, Ottapalam, Kerala, India.
- 2) **Best Poster Presentation Award** in “International Conference on Recent Trends in Materials Science and Technology (ICMST) 2010”. Organized by: MRSI, Thiruvananthapuram & Indian Institute of Space Science and Technology (IIST), Thiruvananthapuram, India.
- 3) **Best Poster Presentation Award** in “National Seminar on Recent Advances in Polymer Science and Technology-2012” Organized by: Society for Polymer Science India and Mar Ivanios College Trivandrum, India.
- 4) **Invited Speaker** in “Polymer Conference for Young Researchers-2014” Organized by: Society for Polymer Science India, Trivandrum Chapter.

- 5) **Best Poster and Oral Presentation Awards** in “Materials Science Research day-2015”
Organized by: College of Materials Science and Technology Master program, College of Arts and Sciences, Qatar University
- 6) **First Runner up Award** in “Fikra: Rising Stars of the Plastics Industry” competition featured at the GPCA Plastics Excellence Awards 2016 in Dubai.

Journal Publications

1. E. Fayyad, K. K. Sadasivuni, **D. Ponnamma**, M. A. Al-Maadeed. Hybrid composite coatings of chitosan/graphene oxide/ oleic acid for corrosion protection of carbon steel Carbohydrate Polymers. Carbohydrate Polymers, 2016, Accepted.
2. D. Thomas, S. Augustine, K. K. Sadasivuni, **D. Ponnamma**, A.Y. Alhaddad, J.J. Cabibihan, K A Vijayalakshmi. Microtron irradiation induced tuning of band gap and photo response of Al-ZnO thin films synthesized by mSILAR. Journal of Electronic Materials, 2016, Accepted.
3. **D. Ponnamma**, A. Saiter, J.M. Saiter, S. Thomas, Y. Grohens, M. A. Al-Maadeed, K. K. Sadasivuni. Influence of temperature on the confinement effects of micro and nano level graphite filled poly(isoprene-co-isobutylene) composites. Journal of Polymer Research, 2016, Accepted.
4. K.K. Sadasivuni, **D. Ponnamma**, H.U. Ko, L. Zhai, H. C. Kim, J. Kim. Electroactive and Optically Adaptive Bionanocomposite for Reconfigurable Microlens. Journal of Physical Chemistry B. 2016; 120 (20): 4699–4705.
5. M Jeyaraj, R. A. Praphakaran, C. Rajendran, **D. Ponnamma**, K. K. Sadasivuni, M. A. Munusamy, R. Mariappan. Surface Functionalization of Natural Lignin Isolated from Aloe Barbadensis Miller Biomass by Atom Transfer Radical Polymerization for Enhanced Anticancer Efficacy. RSC Adv., 2016, (DOI: 10.1039/C6RA01866A)
6. K.K. Sadasivuni, **D. Ponnamma**, H.U. Ko, H. C. Kim, L. Zhai, J. Kim. Flexible NO₂ sensors from renewable cellulose nanocrystals/iron oxide composites Flexible NO₂ sensors from renewable cellulose nanocrystals/iron oxide composites. Sensors and Actuators B: Chemical. 2016; 233: 633–638.
7. **D. Ponnamma**, K.K. Sadasivuni, J.J. Cabibihan, W. J. Yoon, B. Kumar. Reduced Graphene Oxide Filled Poly(dimethyl siloxane) based Transparent Stretchable, and Touch-Responsive Sensors. Appl. Phys. Lett. 2016; 108: 171906.
8. **D. Ponnamma**, K. K. Sadasivuni, M. Strankowski, P. Kasak, I. Krupa, M. A. A. Al-Maadeed.

Eco-Friendly Electromagnetic Interference Shielding Materials from Flexible Reduced Graphene Oxide Filled Polycaprolactone/Polyaniline Nanocomposites. *Polymer-Plastics Technology and Engineering*; 2016 (DOI:10.1080/03602559.2015.1132435)

9. K. Deshmukh, M. B. Ahamed, R. R. Deshmukh, S. K. K. Pasha, K. Chidambaram, K. K. Sadasivuni, **D. Ponnamma**, M. A. A. Al-Maadeed. Eco-Friendly Synthesis of Graphene Oxide Reinforced Hydroxypropyl Methylcellulose (HPMC)/Polyvinyl Alcohol (PVA) Blend Nanocomposites Filled with Zinc Oxide (ZnO) Nanoparticles for High-k Capacitor Applications. *Polymer-Plastics Technology and Engineering*; 2016 (DOI:10.1080/03602559.2015.1132451)
10. K. Deshmukh, M. B. Ahamed, R. R. Deshmukh, S.K. K. Pasha, K. K. Sadasivuni, **D. Ponnamma**, K. Chidambaram. Synergistic effect of vanadium pentoxide and graphene oxide in polyvinyl alcohol for energy storage application. *European Polymer Journal* 2016; 76: 14-27 (doi:10.1016/j.eurpolymj.2016.01.022)
11. **D. Ponnamma**, K. K. Sadasivuni, S. Thomas, I. krupa, M. A. S. A. Al-Maadeed. Flexible oil sensors based on multi walled carbon nanotube filled isoprene elastomer composites. *Rubber Chemistry and Technology* 2016; (doi: <http://dx.doi.org/10.5254/rct.15.84841>)
12. K.S. Usha Devi, **D Ponnamma**, V Causin, H J Maria and S Thomas. Enhanced morphology and mechanical characteristics of clay/styrene butadiene rubber nanocomposites. *Applied Clay Science* 2015; 114: 568–576. (doi:10.1016/j.clay.2015.07.009).
13. **D Ponnamma**, R Ramachandran, S Hussain, R. Rajaraman, G. Amarendra, K.T. Varughese and S Thomas. Free-volume correlation with mechanical and dielectric properties of natural rubber/multi walled carbon nanotubes composites. *Composites Part A: Applied Science and Manufacturing* 2015; 77: 164–171. (doi:10.1016/j.compositesa.2015.06.023).
14. **D.Ponnamma**, Q Guo, I Krupa, M Al-Maadeed, KT Varughese, S Thomas, K.K. Sadasivuni. Graphene and graphitic derivatives filled polymer composites as potential sensors. *Physical Chemistry Chemical Physics* 2015; 17(6): 3954-3981. (DOI: 10.1039/C4CP04418E)
15. K. K. Sadasivuni, **D. Ponnamma**, S. Thomas, Y. Grohens Evolution from graphite to graphene elastomer composites. *Progress in Polymer Science*, 2014; 39(4): 749-780. (DOI: 10.1016/j.progpolymsci.2013.08.003)
16. D. Ponnamma, S. H. Sung, J. S. Hong, K. H. Ahn, K.T. Varughese, S. Thomas. Influence of non-covalent functionalization of carbon nanotubes on the rheological behavior of natural rubber latex nanocomposites. *European Polymer Journal* 2014; 53: 147–159. (DOI:

10.1016/j.eurpolymj.2014.01.025)

17. K. K. Sadasivuni, **D. Ponnamma**, P. Kasak, I. Krupa, M.A. Al-Maadeed. Designing dual phase sensing materials from polyaniline filled styrene-isoprene-styrene composites. *Material Chemistry and Physics*, 2014; 147(3): 1029-1036. (DOI 10.1002/pen.23992)
18. **D. Ponnamma**, J. George, M. G. Thomas, C. C. Han, S. Valić, M. Mozetič, U. Cvelbar, S. Thomas. Investigation on the thermal and crystallization behaviour of high density polyethylene/acrylonitrile butadiene rubber blends and their composites. *Polymer Engineering and Science*, 2014; 55(5): 1203-1210. (DOI 10.1002/pen.23992)
19. **D.Ponnamma**, K.K. Sadasivuni, Y. Grohens, S Thomas. Carbon Nanotubes based Elastomer Composites-An Approach towards Multifunctional Materials. *Journal of Material Chemistry C*, 2014; 2(40): 8446-8485. (DOI: 10.1039/C4TC01037J)
20. K.K. Sadasivuni, **D. Ponnamma**, B. Kumar, M Strankowsky, R Cardinels, P Mauldenares, S. Thomas, Y. Grohens. Dielectric properties of modified graphene oxide filled polyurethane nanocomposites and its correlation with rheology. *Composite Science and Technology* 2014; 104:18-25. (doi:10.1016/j.compscitech.2014.08.025)
21. **D. Ponnamma**, K.K. Sadasivuni, M. Strankowski, Q. Guo, S. Thomas. Synergistic Effect of Multi Walled Carbon Nanotubes and Reduced Graphene Oxides in Natural Rubber for Sensing Application. *Softmatter* 2013; 9: 10343-10353 (DOI: 10.1039/C3SM51978C)
22. **D. Ponnamma**, K.K. Sadasivuni, M. Strankowsky, P. Moldenaers, S. Thomas, Y. Grohens. Interrelated Shape Memory and Payne Effect in Polyurethane/Graphene Oxide Nanocomposites. *RSC Advances*, 2013; 3: 16068-16079. (DOI: 10.1039/C3RA41395K)
23. **D. Ponnamma**, S. Thomas Polymer latex nanocomposites: recent advances. Published in Conference Proceedings, Latex and Synthetic Polymer Dispersions 2012, Kuala Lumpur, Malaysia 13-14 March 2012. ISBN: 978-1-84735-725-0. SmithersRapra Technology Ltd, 2012)

Book Chapters

1. **D. Ponnamma**, K. K. Sadasivuni, M. A. Al-Maadeed. Piezo and Thermo Electric Materials from Biopolymer Composites. In *Biopolymer Composites in Electronics*. Elsevier, 2016, *In Press*
2. **D. Ponnamma**, K. K. Sadasivuni, M. A. Al-Maadeed. Introduction of Biopolymer Composites: What to do in electronics? In *Biopolymer Composites in Electronics*. Elsevier, 2016, *In Press*
3. **D Ponnamma**, D. Rouxel, S Thomas. Spectroscopy: Advantages and application areas of

polymer nanocomposites- State of the art, new challenges and opportunities. In Spectroscopy of Polymer Nanocomposites. Elsevier 2016; *In press*

4. **D. Ponnamma**, K K Sadasivuni, KT Varughese, S Thomas, MA AlMa'adeed. Natural polyisoprene composites and their electronic applications. In Flexible and Stretchable Electronic Composites. Springer International Publishing 2016; 1-35
5. K K Sadasivuni, **D. Ponnamma**, J J Cabibihan, M A AlMa'adeed. Electronic Applications of Polydimethylsiloxane and Its Composites. In Flexible and Stretchable Electronic Composites. Springer International Publishing 2016; 199-228.
6. **D. Ponnamma**, K.K. Sadasivuni. The role of graphene in electronics: Theory and Practice. In Graphene-Based Polymer Nanocomposites in Electronics. Springer International Publishing 2015; 1-24.
7. P. Noorunnisa Khanam, **D. Ponnamma**, M.A. AL-Maadeed. Electrical Properties of Graphene Polymer Nanocomposites. In Graphene-Based Polymer Nanocomposites in Electronics. Springer International Publishing 2015; 25-47.
8. **D. Ponnamma**, S. Thomas. Origin of nonlinear viscoelasticity in filled rubbers: Theory and Practice. In Non-linear viscoelasticity of rubber composites and Nanocomposites. Springer International Publishing 2014; 1-13.
9. E. Abraham, M. S. Thomas, **D. Ponnamma**, L. Pothan, S. Thomas. Biofiber Reinforced Natural Rubber Composites: Mechanical, Thermal and Biodegradation Properties. In Handbook of Green Materials: Volume 4, 2014; 105-118. (DOI: 10.1142/9789814566469_0054)
10. **D. Ponnamma**, P. M. Visakh, A. P. Mathew, A. K. Chandra and S. Thomas. Advances in Elastomers: Their Blends and Interpenetrating Networks-State of Art, New Challenges and Opportunities. In Advances in Elastomers I. Springer International Publishing 2013; 1-9.
11. **D. Ponnamma**, C. J. Chirayil, K. K. Sadasivuni, L. Somasekharan, Y. Srinivasarao, J. Abraham and S. Thomas. Special Purpose Elastomers: Synthesis, Structure-Property Relationship, Compounding, Processing and Applications. In Advances in Elastomers I. Springer International Publishing 2013; 47-82.
12. **D. Ponnamma**, P. M. Visakh, A. P. Mathew, A. K. Chandra and S. Thomas. Advances in Elastomers: Their Composites and Nanocomposites: State of Art, New Challenges and Opportunities. In Advances in Elastomers II. Springer International Publishing 2013; 1-9.
13. **D. Ponnamma**, H. J. Maria, A. K. Chandra and S. Thomas. Rubber Nanocomposites: Latest

Trends and Concepts. In Advances in Elastomers II. Springer International Publishing 2013; 69-107.

14. **D. Ponnamma**, K.K. Sadasivuni, S. Thomas. NMR studies of Natural Rubber Composites from Macro to Nanoscales - A Review. "Volume 2- Natural Rubber based Blends and IPNs" Royal Society of Chemistry 2013 (DOI 10.1039/9781849737654-00683)
15. **D. Ponnamma**, S. Thomas. Green Methods to Synthesize and Recycle Materials- A promise to future. In Recent Advances in Rubber Recycling Edited by Y. Grohens, K. K. Sadasivuni and A. Boudenne. Apple Press Academy 2012; 213.

Books Edited

1. K. K. Sadasivuni, J. J. Cabibihan, **D. Ponnamma**, M.A. Al-Maadeed, J. Kim. Biopolymer Composites in Electronics. Elsevier, 2016, ISBN 9780128092613
2. **D Ponnamma**, D. Rouxel, S. Thomas. Spectroscopy of Polymer Nanocomposites. Elsevier 2016; ISBN 978-0-323-40183-8.
3. **D Ponnamma**, K K Sadasivuni, C Wan, S Thomas, M A AlMa'adeed. Flexible and Stretchable Electronic Composites. Springer Series on Polymer and Composite Materials. 2016; ISBN: 978-3-319-23662-9.
4. K. K. Sadasivuni, **D.Ponnamma**, J. Kim, S. Thomas. Graphene based Polymer Nanocomposites in Electronics. Springer Series on Polymer and Composite Materials 2015; ISBN 978-3-319-13874-9.
5. **D. Ponnamma**, S. Thomas Non-Linear Viscoelasticity of Rubber Composites and Nanocomposites: Influence of Filler Geometry and Size in Different Length Scales. Advances in Polymer Science, Springer International Publisher, 2014; ISBN: 978-3-319-08701-6
6. **D. Ponnamma**, A. K. Zachariah, S. Thomas. Recent Advances in Material Science- Volume 1. Polymer Processing and Characterization Polymers. Apple press Academy 2011, ISBN: 97819268951554

RESEARCH SUMMARY

The research is mainly concentrated to develop polymer nanocomposites applicable in various fields such as high performance *sensors, dielectrics and shape memory* materials. Both micro as well as nano fillers are used for polymer reinforcement and especially the effect of conductive fillers such

as graphene, CNT, polyaniline etc. on polymer properties is investigated. Synthesis of conductive polymer and graphene oxide were well practiced.

I have skilled to use techniques like FTIR, Atomic Force Microscopy, Raman, Wide Angle Xray Diffraction, Scanning Electron Microscopy, Transmission Electron Microscopy, Positron Annihilation Lifetime spectroscopy, Rheometer, DMA, and UTM in characterizing the fillers as well as the composites. Fabrication of Inter digital electrode patterns on polymer films using lithography, coating of metal by vapor deposition methods, electrospinning to fabricate the composites etc. are also trained well.

In short stronger, lighter and high performance multi functional materials were fabricated which can have tremendous possibilities in technological field.

FUTURE INTREST

- Development of high performance Sensors, Actuators, Dielectric Materials, Shape memory materials, Energy storage and generation devices.
- Synthesis and modification of biodegradable polymers, nanomaterials and nanocomposites for various electronic applications.
- All polymer nanocomposites for technological applications

REERENCES

1) Prof. Sabu Thomas,

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