A Brief Profile of Dr. D. Krishna Bhat

Name : Dr. D. KRISHNA BHAT

Designation : Professor

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Educational Qualification: M.Sc. (Mangalore University, 1992), Ph.D. (Mangalore University, 1997)

Areas of Research Interest:

- Nanomaterials: Synthesis of nanoparticles and nanocomposites with polymer and graphene based 2D materials by various methods for energy and environmental applications like supercapacitors and photocatalysis.
- Thermoelectrics: Synthesis of chalcogenides and perovskite oxide based thermoelectric materials and electronic structure engineering for achieving high figure of merit.
- Nanofluids: Synthesis of metal/metal oxide nanofluids with enhanced thermal conductivity and stability for advanced heat transfer applications.
- Polymer Science: Preparation of biodegradable polymer blends using commercial and natural polymers; characterization and study of physico-chemical properties of polymer blends.
- Solution Chemistry: Study of molecular interactions in polymer solutions; solutions of biologically important molecules in water and non-aqueous solvents in the presence of metal salts.

Research Projects:

- *Principal Investigator* of CSIR Research project titled 'Development of novel thermoelectric materials', Grant amount: 10.5 lakhs (2017-20).
- *Principal Investigator* of SERB Research project titled 'High performance thermoelectric materials via band engineering', Grant amount: 26.76 lakhs (2016-19).

- *Co-Investigator* of DRDO Research project titled 'Development of supercapacitors based on polymer electrolytes', Grant amount: 14.9 lakhs (2010-13).

- *Principal Investigator* of DRDO Research project titled 'Molecular interactions in dipeptide metal salt solution systems', Grant amount: 14.12 lakhs (2008-11).

- *Co-ordinator of* TEQIP Network Institutions Project titled 'Preparation of ZnO nanomaterials for photocatalytic applications', Grant amount: 1.5 lakhs (2007-08).

- *Co-ordinator of* SERC Young Scientist Project titled 'Development of new magnetic nanocomposites', Grant amount: 11.52 lakhs (2006-09).

- *Co-ordinator* of MHRD R&D Project titled 'Development of new biodegradable polymers', Grant amount: Rs. 9.0 lakhs (2005-08).

- *Co-Investigator* of DRDO Research project titled 'Synthesis and evaluation of electrical, electronic, electrochemical and optical properties of some conducting polyheterocycles', Grant amount: Rs. 15.21 lakhs (2003-06).

- *Co-ordinator* of MHRD R&D Project titled 'Molecular interactions in some ionomer and polyelectrolyte solutions', Grant amount: Rs.5.0 lakhs (2003-06).

Awards/Recognitions:

- Secured a position in the list of **top 2% scientists of the world for career long and single year impact continuously for the last three years (2020, 2021 and 2022)** according to the study conducted by Stanford University in collaboration with Elsevier publications.
- Recognized as **Highly Cited Author (top 5 %, capped at top 100 papers)** across **Royal Society of Chemistry journals (2020, 2021, 2022).**
- **SERC Young Scientist Award**, Department of Science and Technology (2006).
- **SERC Visiting Fellowship**, Department of Science and Technology (2006).

Publications:

Google scholar link: https://scholar.google.com/citations?user=Oa-3JSQAAAAJ&hl=en

Vidwan profile link: https://nitk.irins.org/profile/54553

Recognition received by the research publications:

- Editor's Choice paper in Materials Today Physics: **Bhat DK**, Shenoy SU. *Mat. Today Phys*. 2018; 4: 12 - 18.
- Most cited articles (top 25) since 2017 as per scopus data in Materials Today Chemistry: Sadiq MMJ, Shenoy SU, **Bhat DK**. *Mat. Today. Chem*. 2017; 4: 133 - 141.
- Most cited articles (top 25) since 2018 as per scopus data in Materials Today Physics: **Bhat DK**, Shenoy SU. *Mat. Today Phys*. 2018; 4: 12 - 18.
- Most cited articles (top 25) since 2019 as per scopus data in Materials Today Physics: **Bhat DK,** Shenoy SU. *Mat. Today Phys*. 2019; 11: 100158.
- Hot article in Nanoscale Advances in 2020: **Bhat DK**, Bantawal H, Shenoy SU. *Nanoscale Adv*. 2020; 2: 5688 - 5698.
- Most popular article in Journal of Materials Chemistry C in 2020: Shenoy SU, **Bhat DK**. *J. Mater. Chem. C* 2020; 8: 2036 - 2042.
- Hot paper in Energy Advances in 2022: Shenoy SU, **Bhat DK**. *Energy Adv*. 2022; 1:9-14.
- Hot paper and Highlight India in Energy Advances in 2022: Shenoy SU, **Bhat DK**. *Energy Adv*. 2022; 1:15-20.

List of Research Publications (Last five years):

1. **D.K. Bhat**, S.P. Kumar, U.S. Shenoy, Design, synthesis, and characterization of stable copper nanofluid with enhanced thermal conductivity, *Materials Today Communications*, **2024**, 39, 109129.
2. U.S. Shenoy, **D.K. Bhat**, "Towards achieving an ideal convergence of light and heavy electron conduction bands in SnTe: Insights into copper doping." *Journal of Alloys and Compounds Communications*, **2024**, https://doi.org/10.1016/j.jacomc.2024.03.001.
3. **D.K. Bhat**, S.P. Kumar, U.S. Shenoy, "In-situ synthesis of cuprous oxide nanofluid using ribose for enhanced thermal conductivity and stability." *International Journal of Heat and Fluid Flow*, **2024**, 106, 109321.

4. U.S. Shenoy, **D.K. Bhat**, "Tuning the electronic structure of rhombohedral and cubic GeTe for thermoelectric application: Influence of molybdenum doping." *Journal of Physics and Chemistry of Solids*, **2024**, 188, 111943.

5. A. Bhava, U.S. Shenoy, **D.K. Bhat**, "Silver doped barium titanate nanoparticles for enhanced visible light photocatalytic degradation of dyes." *Environmental Pollution*, **2024**, 344, 123430.

6. S.P. Kumar, U.S. Shenoy, **D.K. Bhat**, "A direct approach towards synthesis of copper nanofluid by one step solution phase method." *Journal of Crystal Growth*., **2024**, 630, 127591.

7. S.K. Kihoi, U.S. Shenoy, H. Kim, J.N. Kahiu, C.M. Kim, K. Park, **D.K. Bhat**, H.S. Lee, "Enhanced electrical, thermal and mechanical properties of SnTe through equimolar multication alloying for suitable device applications." *ACS Applied Energy Materials*, **2024**, 7, 1149 - 1161.

8. **D.K. Bhat**, H Bantawal, PI Uma, SP Kumar, US Shenoy, 'Designing Sustainable Porous Graphene-CaTiO3 Nanocomposite for Environmental Remediation', *Sustainable Chemistry for the Environment,* **2024**, 5, 100071

9. **D.K. Bhat**, P.I. Uma, U.S. Shenoy, "Insights into the dopant engineering in copper-doped $SrTiO_3$ nanocubes." *Journal of Hazardous Materials Advances*, **2023**, *12*, 100380.

10. P.I. Uma, U.S. Shenoy, **D.K. Bhat**, "Nanocubic copper doped $SrTiO_3$ for photoreduction of Cr (VI) and photodegradation of methyl violet." *ACS Applied Nano Materials*, **2023**, *6*, 16798 - 16804.

11. **D.K. Bhat**, H. Bantawal, P.I. Uma, U.S. Shenoy, "Enhanced photoresponse and efficient charge transfer in porous graphene-$BaTiO_3$ nanocomposite for high performance photocatalysis." *Diamond and Related Materials*, **2023**, *139*, 110312.

12. S.K. Kihoi, U.S. Shenoy, J.N. Kahiu, H. Kim, D.K. Bhat, H.S. Lee, "Tailoring the thermoelectric performance of the layered topological insulator $SnSb_2Te_4$ through Bi positional doping at the Sn and Sb cation sites." *ACS Applied Electronic Materials*, **2023**,

5, 4504 - 4513.

13. P.I. Uma, U.S. Shenoy, **D.K. Bhat**, "Doped $BaTiO_3$ cuboctahedral nanoparticles: Role of copper in photocatalytic degradation of dyes." *Applied Surface Science Advances*, **2023**, *15*, 100408.

14. J.N. Kahiu, S.K. Kihoi, H. Kim, U.S. Shenoy, **D.K. Bhat**, H.S. Lee, "Asymmetric thermoelectric performance tuning in low-cost $ZrFe_xNi_{1-x}Sb$ double half-Heusler materials." *ACS Applied Energy Materials*, **2023**, *6*, 4305 - 4316.

15. P.I. Uma, U.S. Shenoy, **D.K. Bhat**, "Electronic structure engineering of $BaTiO_3$ cuboctahedrons by doping copper to enhance the photocatalytic activity for environmental remediation." *Journal of Alloys and Compounds*, **2023**, *948*, 169600.

16. S.K. Kihoi, U.S. Shenoy, J.N. Kahiu, H. Kim, **D.K. Bhat**, H.S. Lee, "Pushing the limit of synergy in SnTe-based thermoelectric materials leading to an ultra-low lattice thermal conductivity and enhanced ZT." *Sustainable Energy and Fuels*, **2023**, *7*, 1916 - 1929.

17. H. Kim, S.K. Kihoi, U.S. Shenoy, J.N. Kahiu, D.H. Shin, **D.K. Bhat**, H.S. Lee, "High thermoelectric and mechanical performance achieved by hyperconverged electronic structure and low lattice thermal conductivity in GeTe through $CuInTe_2$ alloying." *Journal of Materials Chemistry A*, **2023**, *11*, 8119 - 8130.

18. Y.N. Sudhakar, M. Selvakumar, **D.K. Bhat**, "Enhancement and investigation of biodegradability of poly (methyl methacrylate) and poly (vinyl chloride) by blending with biodegradable polymer." *Polymer Bulletin*, **2022**, *80*, 5623 - 5639.

19. U.S. Shenoy, D.K. Goutham, **D.K. Bhat**, "Probing of Bi doped GeTe thermoelectrics leads to revelation of resonant states." *Journal of Alloys and Compounds*, **2022**, *921*, 165965.

20. U.S. Shenoy, D.K. Goutham, **D.K. Bhat**, "A case of perfect convergence of light and heavy hole valence bands in SnTe: The role of Ge and Zn co-dopants." *Materials Advances*, **2022**, *3*, 5941 - 5946.

21. U.S. Shenoy, D.K. Goutham, and **D.K. Bhat**, "Resonance states and hyperconvergence induced by tungsten doping in SnTe: Multiband transport leading to a propitious

thermoelectric material." *Journal of Alloys and Compounds*, **2022**, *905*, 164146.

22. S.K. Kihoi, U.S. Shenoy, J.N. Kahiu, H. Kim, **D.K. Bhat** and H.S. Lee, "Ultra-low lattice thermal conductivity and enhanced mechanical properties of Cu and Sb co-doped SnTe thermoelectric material with a complex microstructure evolution." *ACS Sustainable Chemistry and Engineering*, **2022**, *10*, 1367 - 1372.

23. U.S. Shenoy, **D.K. Bhat**, "Halide (X = I, Br, Cl) Doping to tune the electronic structure for conversion of $Pb_{0.6}Sn_{0.4}Te$ into a high performing thermoelectric material." *Energy Advances*, **2022**, *1*, 15 – 20.

24. U.S. Shenoy, **D.K. Bhat**, "Molybdenum as a versatile dopant in SnTe: A promising material for thermoelectric application." *Energy Advances*, **2022**, *1*, 9 - 14.

25. U.S. Shenoy, **D.K. Bhat**, "Selective co-doping improves the thermoelectric performance of SnTe: An outcome of electronic structure engineering." *Journal of Alloys and Compounds*, **2021**, *892*, 162221.

26. R. Basu, S. Mandava, U.S. Shenoy, D.K. Bhat, B. Khasimsaheb, A.K. Debnath, A. Singh, S. Neeleshwar, "Synergistic manifestation of band and scattering engineering in single aliovalent Sb alloyed anharmonic SnTe alloy in concurrence with rule of parsimony." *Materials Advances*, **2021**, *2*, 7891 - 7906.

27. J.N. Kahiu, U.S. Shenoy, S.K. Kihoi, H. Kim, S. Yi, **D.K. Bhat**, H.S. Lee, "Optimized electronic performance in half-heusler Ti-doped NbFeSb materials by stoichiometric tuning at the Fe and Sb sites." *Journal of Alloys and Compounds*, **2021**, *891*, 162033.

28. U.S. Shenoy, **D.K. Bhat**, "Vanadium: A protean dopant in SnTe for augmenting its thermoelectric performance." *ACS Sustainable Chemistry and Engineering*, **2021**, *9*, 13033 - 13038.

29. U.S. Shenoy, **D.K. Bhat**, "Improving ZT of SnTe by electronic structure engineering: Unusual behaviour of Bi dopant in the presence of Pb as a co-dopant." *Materials Advances*, **2021**, *2*, 6267 - 6271.

30. H. Bantawal, U.S. Shenoy, **D.K. Bhat**, "Vanadium doped $CaTiO_3$ cuboids: Role of

vanadium in improving the photocatalytic activity." *Nanoscale Advances*, **2021**, *3*, 5301 - 5311.

31. S.K. Kihoi, U.S. Shenoy, **D.K. Bhat,** H.S. Lee, "Complimentary effect of co-doping aliovalent elements Bi and Sb in self-compensated SnTe-based thermoelectric materials." *Journal of Materials Chemistry C*, **2021**, *9*, 9922 - 9931.

32. U.S. Shenoy, **D.K. Bhat**, "Electronic structure modulation of $Pb_{0.6}Sn_{0.4}Te$ via zinc doping and its effect on the thermoelectric properties." *Journal of Alloys and Compounds*, **2021**, *872*, 159681.

33. M. Sethi, U.S. Shenoy, **D.K. Bhat**, "Hassle-free solvothermal synthesis of NiO nanoflakes for supercapacitor application." *Physica B Condensed Materials*, **2021**, *611*, 412959.

34. S.K. Kihoi, J.N. Kahiu, H. Kim, U.S. Shenoy, **D.K. Bhat,** S. Yi, H.S. Lee, "Optimized Mn and Bi co-doping in SnTe based thermoelectric material: A case of band engineering and density of states tuning." *Journal of Materials Science and Technology*, **2021**, *85*, 76 - 86.

35. M. Sethi, U.S. Shenoy, **D.K. Bhat**, "Simple solvothermal synthesis of porous graphene-NiO nanocomposites with high cyclic stability for supercapacitor application." *Journal of Alloys and Compounds*, **2021**, *854*, 157190.

36. U.S. Shenoy, **D.K. Bhat**, "Electronic structure engineering of $SrTiO_3$ via rhodium doping: A DFT study." *Journal of Physics and Chemistry of Solids*, **2021**, *148*, 109708.

37. Y.N. Sudhakar, M. Selvakumar, **D.K. Bhat**, "Investigations on thermo-mechanical properties of organically modified clay nanocomposites for packaging applications." *Polymers and Polymer Composites*, **2021**, *29*, 1191 - 1199.

38. U.S. Shenoy, **D.K. Bhat**, "Vanadium doped $BaTiO_3$ as high performance thermoelectric material: Role of electronic structure engineering." *Materials Today Chemistry*, **2020**, *18*, 100384.

39. **D.K. Bhat**, H. Bantawal, U.S. Shenoy, "Rhodium doping augments photocatalytic activity of barium titanate: Effect of electronic structure engineering." *Nanoscale Advances*, **2020**,

2, 5688 - 5698.

40. **D.K. Bhat**, U.S. Shenoy, "Resonance levels in GeTe thermoelectrics: Zinc as a new multifaceted dopant." *New Journal of Chemistry*, **2020**, *44*, 17664 - 17670.

41. S. Balachandran, K.J. Jothi, K. Selvakumar, **D.K. Bhat**, K. Sathiyanarayanan, M. Swaminathan, "Solar active ZnO-Eu_2O_3 for energy and environmental applications." *Materials Chemistry and Physics*, **2020**, *256*, 123624.

42. M. Sethi, U.S. Shenoy, **D.K. Bhat**, "Porous graphene-$NiFe_2O_4$ nanocomposite with high electrochemical performance and high cyclic stability for energy storage application." *Nanoscale Advances*, **2020**, *2*, 4229 - 4241.

43. M. Sethi, **D.K. Bhat**, "Engineering porous nanopillars of Co_3O_4: Hydrothermal synthesis and energy storage applications." *AIP Conference Proceedings*, **2020**, *2247*, 040014.

44. H. Bantawal, **D.K. Bhat**, "$BaTiO_3$-graphene nanocomposite as a photocatalyst for the degradation of methylene blue." *AIP Conference Proceedings*, **2020**, *2247*, 040004.

45. M. Sethi, **D.K. Bhat**, "Novel porous graphene synthesized through solvothermal approach as high performance electrode material for supercapacitors." *AIP Conference Proceedings*, **2020**, *2244*, 040002.

46. **D.K. Bhat**, U.S. Shenoy, "Mg/Ca doping ameliorates the thermoelectrics properties of GeTe: influence of electronic structure engineering." *Journal of Alloys and Compounds*, **2020**, *834*, 155989.

47. **D.K. Bhat**, U.S. Shenoy, "SnTe thermoelectrics: Dual step approach for enhanced performance." *Journal of Alloys and Compounds*, **2020**, *834*, 155181.

48. U.S. Shenoy, **D.K. Bhat**, "Enhanced thermoelectric properties of vanadium doped $SrTiO_3$: A resonant dopant approach." *Journal of Alloys and Compounds*, **2020**, *832*, 154958.

49. M. Sethi, **D.K. Bhat**, "NiO nanoplates for energy storage application: Role of electrolyte concentration on the energy storage property." *Materials Today Proceedings*, **2020**, 33, 5103 – 5108.

50. H. Bantawal, U.S. Shenoy, **D.K. Bhat**, "Vanadium-doped $SrTiO_3$ nanocubes: Insight into role of vanadium in improving the photocatalytic activity." *Applied Surface Science*, **2020**, *513*, 145858.

51. Y.N. Sudhakar, M. Selvakumar, **D.K. Bhat**, S. Karazhanov, R.S. Chandrabose, "Supercapacitor studies of activated carbon functionalized with poly(ethylene dioxythiophene): Effects of surfactants, electrolyte concentration on electrochemical properties." *Materials Letters*, **2020**, *273*, 127978.

52. M. Sethi, U.S. Shenoy, M. Selvakumar, **D.K. Bhat**, "Facile solvothermal synthesis of $NiFe_2O_4$ nanoparticles for high performance supercapacitor applications." *Frontiers of Material Science*, **2020**, *14*, 120 - 132.

53. M. Sethi, U.S. Shenoy, **D.K. Bhat**, "Porous graphene-$NiCo_2O_4$ nanorod hybrid composite as high performance supercapacitor electrode material." *New Journal of Chemistry*, **2020**, *44*, 4033 - 4041.

54. S. Mutyala, M.M.J. Sadiq, M. Gurulakshmi, C. Suresh, **D.K. Bhat**, K. Shanthi, J. Mathiyarasu, "Disintegration of flower like MoS_2 to limply allied layers on spherical nanoporous TiO_2: Enhanced visible light photocatalytic degradation of methylene blue." *Journal of Nanoscience and Nanotechnology*, **2020**, *20*, 1118 - 1129.

55. U.S. Shenoy, **D.K. Bhat**, "Bi and Zn co-doped SnTe thermoelectrics: interplay of resonance levels and heavy hole band dominance leading to enhanced performance and record high room temperature ZT." *Journal of Materials Chemistry C*, **2020**, *8*, 2036 - 2042.

56. D.N. Sangeetha, **D.K. Bhat**, S.S. Kumar, M. Selvakumar, "Improving hydrogen evolution reaction and capacitive properties on CoS/MoS_2 decorated carbon fibers." *International Journal of Hydrogen Energy*, **2020**, 45, 7788 - 7800.

57. **D.K. Bhat**, S.U Shenoy, "Zn: A versatile resonant dopant for SnTe thermoelectrics." *Materials Today Physics*, **2019,** *11*, 100158.

58. H. Bantawal, M. Sethi, S.U. Shenoy and **D.K. Bhat**, "Porous graphene wrapped $SrTiO_3$

nanocomposite: Sr-C bond as an effective coadjutant for high performance photocatalytic degradation of methylene blue." *ACS Applied Nano Materials*, **2019**, *2*, 6629 - 6636.

59. M. Sethi, **D.K. Bhat**, "Electrochemical study of graphene-$NiCo_2O_4$ nanocomposite prepared through solvothermal approach." *AIP Conference Proceedings*, **2019**, *2142*, 140027.

60. M. Sethi, H. Bantawal, S.U. Shenoy, **D.K. Bhat**, "Eco-friendly synthesis of porous graphene and its utilization as high performance supercapacitor electrode material." *Journal of Alloys and Compounds*, **2019**, *799*, 256 - 266.

61. C. Prabukumar, M.M.J. Sadiq, **D.K. Bhat**, K.U. Bhat, "SnO_2 nanoparticles functionalized MoS_2 nanosheets as an electrode material for supercapacitor application." *Materials Research Express*, **2019**, *6*, 085526.

62. U.S. Shenoy, **D.K. Bhat**, "Electronic structure engineering of tin telluride through co-doping of bismuth and indium for high performance thermoelectrics: a synergistic effect leading to record high room temperature ZT in tin telluride." *Journal of Materials Chemistry C*, **2019**, *7*, 4817 - 4821.

63. M. Sethi, **D.K. Bhat**, "Facile solvothermal synthesis and high supercapacitor performance of $NiCo_2O_4$ nanorods." *Journal of Alloys and Compounds*, **2019**, *781*, 1013 - 1020.

64. U.S. Shenoy, H. Bantawal, **D.K. Bhat**, "Band engineering of $SrTiO_3$: Effect of synthetic technique and site occupancy of doped rhodium." *The Journal of Physical Chemistry C*, **2018**, *122*, 27567 - 27574.

65. D.N. Sangeetha, **D.K. Bhat**, M. Selvakumar, "h-MoO_3/activated carbon nanocomposites for electrochemical applications" *Ionics*, **2018**, *25*, 607 - 616.

66. H. Bantawal, **D.K. Bhat**, "Hierarchical porous $BaTiO_3$ nano-hexagons as a visible light photocatalyst." *International Journal of Engineering and Technology*, **2018**, *7*, 105 - 109.

67. H. Bantawal, S.U. Shenoy, **D.K. Bhat**, "Tuning photocatalytic activity of $SrTiO_3$ by varying the Sr/Ti Ratio: Unusual effect of viscosity of synthesis medium." *The Journal of Physical Chemistry C*, **2018**, *122*, 20027 - 20033.

68. M.M.J. Sadiq, S.U. Shenoy, **D.K. Bhat**, "Synthesis of $BaWO_4$/NRGO-g-C_3N_4 nanocomposites with excellent multifunctional catalytic performance via microwave approach" *Frontiers of Materials Science*, **2018**, *12*, 247 - 263.

69. C. Prabukumar, M.M.J. Sadiq, **D.K. Bhat**, K.U. Bhat, "Effect of solvent on the morphology of MoS_2 nanosheets prepared by ultrasonication-assisted exfoliation" *AIP Conference Proceedings*, **2018**, *1943*, 020084.

70. **D.K. Bhat**, S.U. Shenoy, "Enhanced thermoelectric performance of bulk tin telluride: Synergistic effect of calcium and indium co-doping" *Materials Today Physics*, **2018**, *4*, 12 -18.

71. M.M.J. Sadiq, S.U. Shenoy, **D.K. Bhat**, "Novel NRGO-$CoWO_4$-Fe_2O_3 nanocomposite as an efficient catalyst for dye degradation and reduction of 4-nitrophenol" *Materials Chemistry and Physics*, **2018**, *208*, 112 - 122.

72. M.M.J. Sadiq, **D.K. Bhat**, "Novel $NiWO_4$-ZnO-NRGO ternary nanocomposites with enhanced photocatalytic activity" *Materials Today: Proceedings*, **2018**, *5*, 22412 - 22420.

73. S. Shetty, M.M.J. Sadiq, **D.K Bhat**, A.C Hegde, "Electrodeposition of Ni-Mo-rGO composite electrodes for efficient hydrogen production in alkaline medium" *New Journal of Chemistry*, **2018**, *42*, 4661 - 4669.

Book Published:

📖 Y.N. Sudhakar, M. Selvakumar, **D. K. Bhat**, "Biopolymer Electrolytes: Fundamentals and Applications in Energy Storage" *Elsevier Oxford UK*, **2018**, ISBN: 9780128134474.

Book Chapter:

📖 M. Sethi, U.S. Shenoy, **D.K. Bhat**, 'Iron Oxide-Functionalized Graphene Nanocomposites for Supercapacitor Application'. In the book titled, 'Iron Oxide-Based Nanocomposites and Nanoenzymes', Springer Nature, **2023,** DOI: 10.1007/978-3-031-44599-6.

Membership of Academical Bodies:

1. Life member of Indian Society of Technical Education.

2. Life member of Indian Association of Applied Psychologists.
3. Life member of Indian Council of Chemists.
4. Life member of Society for Advancement of Electrochemical Science and Technology.
5. Life member of Chemical Research Society of India.
6. Life member of Indian Science Congress Association.
7. Life member of Materials Research Society of India.
8. Life member of Catalysis Society of India.
9. Life member of The Indian Thermodynamics Society.
10. Life member of Society for Materials Chemistry.

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