Center for Materials for Energy and Environment

Dr. Sandhya Shenoy U
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Dr. Sandhya Shenoy U obtained her M.Sc. (Chemistry) and Ph.D. (Chemistry) from the National Institute of Technology Karnataka, Surathkal in the years 2009 and 2013, respectively. Later, she worked with Prof. U. V. Waghmare and Prof. C. N. R. Rao as a postdoctoral research fellow at Jawaharlal Nehru Center for Advanced Scientific Research (JNCASR), Jakkur, Bangalore. Currently she is a DST INSPIRE Faculty at College of Engineering and Technology, Srinivas University, Mukka, Mangalore. Her research interests include synthesis and simulations of materials for energy and environment. This mainly involves synthesis and simulations of thermoelectric materials which are capable of reversibly converting waste heat into electricity. Synthesis of nanofluids which are basically stable dispersions of nanoparticles in base fluid synthesized with an aim to increase the thermal conductivity of the resulting mixture. Synthesis and simulation of nanocomposites for environmental remediation. The aim of the research work is to develop environmental friendly material to tackle the global crisis of escalating demand for renewable energy and to make earth a pollution free planet.

Areas of Research Interest:

- Thermoelectrics
- Nanofluids
- 2D materials
- Nanomaterial synthesis
- Computational simulation of materials for energy and environment

List of Projects:

Sl. No.	Principal Investigator	Title of Project	Funding Agency	Cost in Rupees	Status
1	Dr. Sandhya Shenoy U	DST INSPIRE Faculty Award	DST, New Delhi	85,00,000	Ongoing

List of Publications:

1. Bhat, D.K. & Shenoy, S.U., (2018). Enhanced Thermoelectric Performance of Bulk Tin Telluride: Synergistic Effect of Calcium and Indium Co-doping. Materials Today Physics, 4, 12–18. DOI: https://doi.org/10.1016/j.mtphys.2018.02.001
2. Sadiq, M.M.J., Shenoy, S.U. & Bhat, D.K., (2018). Novel NRGO-$CoWO_4$-Fe_2O_3 nanocomposite as an efficient catalyst for dye degradation & reduction of 4-nitrophenol. Materials Chemistry Physics, 208, 112–122. DOI: https://doi.org/10.1016/j.matchemphys.2018.01.012.
3. Shenoy, S.U. & Shetty, N.A., (2017). A Simple Single Step Approach towards Synthesis of Nanofluids Containing Cuboctahedral Cuprous Oxide Particles Using Glucose Reduction. Frontiers in Materials Science, 12, 74– 2. DOI: https://doi.org/10.1007/s11706-018-0411-6.
4. Perumal, S., Bellare, P., Shenoy, S.U., Waghmare, U.V. & Biswas, K., (2017). Low Thermal Conductivity and High Thermoelectric Performance in Sb and Bi co-doped GeTe: Complementary Effect of Band Convergence and Nanostructuring. Chemistry of Materials, 29(24), 10426–10435. DOI:10.1021/ acs.chemmater. 7b04023.
5. Shenoy S.U. & Bhat, D.K., (2017). Enhanced Bulk Thermoelectric Performance of $Pb_{0.6}Sn_{0.4}Te$: Effect of Magnesium Doping. The Journal of Physical Chemistry C, 121, 20696–20703. DOI:10.1021/ acs.jpcc.7b07017.
6. Sadiq, M.M.J., Shenoy, S.U. & Bhat, D.K., (2017). $NiWO_4$-ZnO-NRGO ternary nanocomposite as an efficient photocatalyst for degradation of methylene blue and reduction of 4-nitro phenol. Journal of Physics and Chemistry of Solids, 109, 124–133. DOI:10.1016/j.jpcs.2017.05.023.
7. Sadiq, M.M.J., Shenoy, S.U. & Bhat, D.K., (2017). Enhanced photocatalytic performance of N-doped RGO-$FeWO_4$/Fe_3O_4 ternary nanocomposite in environmental applications. Materials Today Chemistry, 4, 133–141. DOI: http://dx.doi.org/10.1016/j.mtchem.2017.04.003.
8. Bhat, D.K. & Shenoy S.U., (2017). High Thermoelectric Performance of Co-Doped Tin Telluride Due to Synergistic Effect of Magnesium and Indium. The Journal of Physical Chemistry C, 121(13), 7123–7130. DOI: 10.1021/acs.jpcc.7b00870.
9. Sadiq, M.M.J., Shenoy, S.U. & Bhat, D.K., (2017). High performance bifunctional catalytic activity of novel zinc tungstate - reduced graphene oxide nanocomposite. Advances in Science, Engineering and Medicine, 9, 115–121. DOI: https://doi.org/10.1166/asem.2017.1977.
10. Roychowdhury, S., Shenoy, S.U., Waghmare, U.V. & Biswas, K., (2017). An enhanced Seebeck coefficient and high thermoelectric performance in p-type In and Mg co-doped $Sn_{1-x}Pb_xTe$ via the co-adjuvant effect of the resonance level & heavy hole valence band. Journal of Material Chemistry C, 5, 5737–5748. DOI:10.1039/C7TC00009J.

11. Shenoy, S.U. & Shetty, N.A., (2017). Direct Synthesis of Nanofluids Containing Novel Hexagonal Disc Shaped Copper Nanoparticles. Journal of Nanofluids, 6, 11–17. DOI: https://doi.org/10.1166/jon.2017.1304.
12. Shenoy, S.U., Waghmare, U.V., Lingampalli, S.R., Roy, A. & Rao, C.N.R., (2017). Effects of aliovalent anion substitution on the electronic structures and properties of ZnO and CdS. Israel Journal of Chemistry, 57, 477–489. DOI: 10.1002/ijch.201600120.
13. Banik, A., Shenoy, S.U., Saha, S., Waghmare, U.V. & Biswas, K., (2016). High Power Factor and Enhanced Thermoelectric Performance of SnTe-$AgInTe_2$: Synergistic Effect of Resonance Level and Valence Band Convergence. Journal of American Chemical Society, 138, 13068–13075. DOI: 10.1021/jacs.6b08382.
14. Roy, A., Shenoy, S.U., Manjunath, K, Vishnoi, P., Waghmare, U.V. & Rao, C.N.R., (2016). Structure and Properties of $Cd_4P_2Cl_3$, an Analogue of CdS. The Journal of Physical Chemistry C, 120, 15063–15069. DOI: 10.1021/acs.jpcc.6b04058.
15. Sadiq, M.M.J., Shenoy, S.U. & Bhat, D.K., (2016). Novel RGO/$ZnWO_4$/Fe_3O_4 nanocomposite as high performance visible light photocatalyst. RSC Advances, 6, 61821–61829. DOI: 10.1039/C6RA13002J.
16. Lingampalli, S.R., Manjunath, K, Shenoy, S.U., Waghmare, U.V. & Rao, C.N.R., (2016). Zn_2NF and Related Analogues of ZnO. Journal of American Chemical Society, 138, 8228 – 8234. DOI: 10.1021/jacs.6b04198.
17. Roychowdhury, S., Shenoy, S.U., Waghmare, U.V. & Biswas, K., (2016). Effect of potassium doping on electronic structure & thermoelectric properties of topological crystalline insulator. Applied Physics Letters, 108, 193901-1– 93901-5. DOI: http://dx.doi.org/10.1063/1.4948969.
18. Shenoy, S.U., Gupta, U., Narang, D.S., Late, D.J., Waghmare, U.V. & Rao, C.N.R., (2016). Electronic structure and properties of layered gallium telluride. Chemistry Physics Letters, 651, 148–154. DOI: http://dx.doi.org/10.1016/j.cplett.2016.03.045.
19. Roychowdhury, S., Shenoy, S.U., Waghmare, U.V. & Biswas, K., (2015). Tailoring of Electronic Structure and Thermoelectric Properties of a Topological Crystalline Insulator by Chemical Doping. Angewandte. Chemie International Edition, 54, 15241–15245. DOI: 10.1002/anie.201508492.
20. Subramanya, B., Bhat, D.K., Shenoy, S.U., Ullal, Y. & Hegde, A.C., (2015). Novel Fe-Ni-Graphene Composite Electrode for Hydrogen Production. International Journal of Hydrogen Energy, 40, 10453–10462. DOI: http://dx.doi.org/10.1016/j.ijhydene.2015.06.040.
21. Subramanya, B., Ullal, Y., Shenoy, S.U., Bhat, D.K. & Hegde, A.C., (2015). Novel Co-Ni-Graphene Composite Electrodes for Hydrogen Production. RSC Advances, 5, 47398–47407. DOI: 10.1039/C5RA07627G.

22. Banik, A., Shenoy, S.U., Anand, S., Waghmare, U.V. & Biswas, K., (2015). Mg Alloying in SnTe Facilitates Valence Band Convergence and Optimizes Thermoelectric Properties. Chemistry of Materials, 27 (2), 581–587. DOI: 10.1021/cm504112m.
23. Shenoy, S.U. & Shetty, N.A., (2015). A Simple Approach Towards Synthesis of Nanofluids Containing Octahedral Copper Nanoparticles. Journal of Nanofluids, 4, 428–434. DOI: https://doi.org/10.1166/jon.2015.1171.
24. Shenoy, S.U. & Shetty, N.A., (2014). Simple glucose reduction route for one step synthesis of copper nanofluids. Applied Nanoscience, 4 (1), 47–54. DOI: 10.1007/s13204-012-0169-6.
25. Shenoy, S.U. & Shetty, N.A., (2013). A facile one step solution route to synthesize cuprous oxide nanofluid. Nanomaterials and Nanotechnology., 3, 5:2013. DOI: https://doi.org/10.5772/56626.
26. Shenoy, S.U. & Shetty, N.A., (2013). Copper nanofluids: A facile synthetic approach. Journal of Nanoengineering and Nanomanufacturing, 3, 64 – 69. DOI: https://doi.org/10.1166/jnan.2013.1110.
27. Shenoy, S.U. & Shetty, N.A., (2013). A facile ascorbic acid reduction method for solution phase single step synthesis of copper nanofluids. Nano Trends: A Journal of Nanotechnology and its Applications, 14, 09734181.
28. Shenoy, S.U. & Shetty, N.A., (2013). A simple solution phase synthesis of copper nanofluids using single step glucose reduction method. Synthesis and Reactivity in Inorganic, Metal-Organic and Nano-metal Chemistry, 43(3), 343 – 348. DOI: http://dx.doi.org/10.1080/15533174.2012.740758.
29. Shenoy, S.U. & Shetty, N.A., (2012). Synthesis of copper nanofluids using ascorbic acid reduction method via one step solution phase approach. Journal of ASTM International, 9(5), JAI104416. DOI: 10.1520/JAI104416.