

PERSONAL INFORMATION

Dr. Mangesh Vikram Khedkar



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Sex Male | Date of birth 24/08/1992 | Nationality Indian

EDUCATION AND TRAINING

16/06/2018–13/07/2022

Ph. D. (Physics)

Department of Physics,

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (India)

Ph. D. Thesis Title: Synthesis, Characterization and Properties of Sodium Silicate based Aerogel using Ambient Pressure Drying

The doctoral work was focused on the preparation and characterization of sodium silicate-based silica aerogels with low density, higher optical transmission and better hydrophobicity of using ambient pressure drying method. We attempted to synthesize sodium silicate-based silica aerogel via ambient pressure drying method and to investigate the structure, thermal stability, microstructure, hydrophobicity and density for oil spill clean-up applications. The prepared samples were characterized by using X-ray diffraction (XRD), Fourier Transform Infrared Spectroscopy (FTIR), Field Emission Scanning Electron Microscopy (FE-SEM), Thermogravimetric and Differential thermal analyses (TG-DTA), Brunauer-Emmett-Teller (BET) analyzer, Contact angle measurements and UV-Vis stereoscopy for their structural, infrared, morphological, optical and hydrophobic properties. Sodium Silicate based Silica aerogel was successfully synthesized using the ambient pressure drying method. The Silica aerogel properties such as density, transmittance and thermal stability were optimized by varying the pH of the reaction. Further, the effect of TMCS concentration was studied resulting in an increase in thermal stability, hydrophobicity and reduction in density. Finally GO Silica aerogel composite was successfully synthesized to further increase the thermal stability, electrical conductivity. The resulting silica aerogel proved its applicability in various applications such as catalysis, coating materials, oil spill clean-up processes and insulating materials due to its high thermal stability, super-hydrophobicity and large specific surface area.

12/07/2013–30/05/2011

M. Sc. (Physics)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (India)

M. Sc. Project: "Effect of Gamma Irradiation on the Electrical Properties of Cobalt Spinel Ferrite Nanoparticles"

Cobalt spinel ferrite nanoparticles were synthesized using a sol-gel auto-combustion technique. The experimental results on structural properties of cobalt spinel ferrite investigated before gamma irradiation and electrical properties of cobalt spinel ferrite investigated before and after gamma irradiation. On gamma irradiation the DC electrical resistivity of nano-crystalline cobalt spinel ferrite nanoparticles is very much influenced. After gamma irradiation The DC electrical resistivity decreases for cobalt spinel ferrite nanoparticles.

RESEARCH PUBLICATIONS

Manuscripts published in International /National Journals	24
Citations	628
<i>h</i> -index	10
<i>I</i> 10-index	10
International/National Conferences Attended	8

EXPERIMENTAL TECHNIQUES

- Synthesis of nanoparticles using sol-gel auto combustion technique
- Deposition of thin films by spray pyrolysis deposition technique
- Handled Powder X-ray diffraction (Bruker D8 Advance)
- Handled pulsed field hysteresis loop tracer for magnetic measurements
- Explored to research institutes like UGC-DAE CSR Indore, IIT Bombay, RUSA Dr. B.A.M.U Aurangabad

PERSONAL SKILLS

Digital skills

- Efficient in using research software viz. Origin, Powder X, Endnote,
- Efficient in using Microsoft Office (MS-Word, Ms-Power point, Ms-Excel, etc)
- Efficient in Adobe Photoshop, After Effects

Communication skills

-Good English language skills acquired during education from Intermediate to Ph.D. with English as the medium of instructions.

ADDITIONAL INFORMATION

Publications

- 1) **Mangesh V. Khedkar**, Somvanshi, S. B., Humbe, A. V., & Jadhav, K. (2019). Surface modified sodium silicate based superhydrophobic silica aerogels prepared via ambient pressure drying process. **Journal of Non-Crystalline Solids,(Elsevier)**, 511, 140-146.
- 2) **Mangesh V. Khedkar.**, Jadhav, S. A., Somvanshi, S. B., Kharat, P. B., & Jadhav, K. (2020). Physicochemical properties of ambient pressure dried surface modified silica aerogels: effect of pH variation. **SN Applied Sciences,(Springer Nature)**, 2(4), 1-10.
- 3) **Mangesh V. Khedkar.**, Humbe, A. V., Rao, A., Bichile, G., & Jadhav, K. (2019). Synthesis of sodium silicate-based aerogels by ambient pressure drying and their physical properties. Paper presented at the AIP Conference Proceedings (American Institute of Physics (AIP Publishing)).
- 4) Jadhav, S. A., **Mangesh V. Khedkar.**, Andhare, D. D., Gopale, S., & Jadhav, K. (2021). Visible light photocatalytic activity of magnetically diluted Ni–Zn spinel ferrite for active degradation of rhodamine B. **Ceramics International, (Elsevier)**, 47(10), 13980-13993.
- 5) Jadhav, S. A., **Mangesh V. Khedkar.**, Somvanshi, S. B., & Jadhav, K. (2021). Magnetically retrievable nanoscale nickel ferrites: An active photocatalyst for toxic dye removal applications. **Ceramics International, (Elsevier)**, 47(20), 28623-28633.
- 6) Jadhav, S. A., Somvanshi, S. B., **Mangesh V. Khedkar.**, Patade, S. R., & Jadhav, K. (2020). Magneto-structural and photocatalytic behavior of mixed Ni–Zn nano-spinel ferrites: visible light-enabled active photodegradation of rhodamine B. **Journal of Materials Science: Materials in Electronics, (Springer)**, 31, 11352-11365.
- 7) Kulkarni, G. D., **Mangesh V. Khedkar.**, Somvanshi, S. B., Borade, R. M., More, S., & Jadhav, K. (2021). Green synthesis and investigations of structural, cation distribution, morphological, and magnetic properties of nanoscale nickel ferrites: the effect of green fuel proportion. **Phase Transitions, (Taylor and Francis)** 1-12.
- 8) More, S., **Mangesh V. Khedkar.**, Kulkarni, G. D., Kadhane, P., Kamble, R., & Jadhav, K. (2021). Effect of iron doping on structural, DC electrical resistivity and ferroelectric properties of BaTiO₃ nanoceramics. **Optik, (Elsevier)**, 247, 167913.
- 9) More, S. P., **Mangesh V. Khedkar.**, Andhare, D. D., Humbe, A. V., & Jadhav, K. (2020). Influence of manganese (Mn) substitution on structural, infrared and dielectric properties of BaTiO₃ nanoceramics. **Journal of Materials Science: Materials in Electronics,**

(Springer),31(22), 19756-19763.

- 10) Andhare, D. D., Patade, S. R., **Mangesh V. Khedkar**, Nawpute, A. A., & Jadhav, K. M. (2022). Intensive analysis of uncoated and surface modified Co-Zn nanoferrite as a heat generator in magnetic fluid hyperthermia applications. **Applied Physics A, (Springer)**, 128(6), 1-12.
- 11) Somvanshi, S. B., Jadhav, S. A., **Mangesh V. Khedkar**., Kharat, P. B., More, S., & Jadhav, K. (2020). Structural, thermal, spectral, optical and surface analysis of rare earth metal ion (Gd³⁺) doped mixed Zn–Mg nano-spinel ferrites. **Ceramics International, (Elsevier)**, 46(9), 13170-13179. 1
- 12) Somvanshi, S. B., Kharat, P. B., Mangesh V. Khedkar., & Jadhav, K. (2020) Hydrophobic to hydrophilic surface transformation of nano-scale zinc ferrite via oleic acid coating: magnetic hyperthermia study towards biomedical applications. *Ceramics International, (Elsevier)*, 46(6), 7642-7653.
- 13) Somvanshi, S. B., **Mangesh V. Khedkar**., Kharat, P. B., & Jadhav, K. (2020). Influential diamagnetic magnesium (Mg²⁺) ion substitution in nano-spinel zinc ferrite (ZnFe₂O₄): thermal, structural, spectral, optical and physisorption analysis. **Ceramics International, (Elsevier)**, 46(7), 8640-8650.
- 14) Somvanshi, S. B., Patade, S. R., Andhare, D. D., Jadhav, S. A., **Mangesh V. Khedkar**, Kharat, P. B., Jadhav, K. (2020). Hyperthermic evaluation of oleic acid coated nanospinel magnesium ferrite: enhancement via hydrophobic-to-hydrophilic surface transformation. **Journal of Alloys and Compounds, (Elsevier)**, 835, 155422.

Conference proceedings

- 1) Jadhav, S. A., Raut, A. V., **Mangesh V. Khedkar**, Somvanshi, S. B., & Jadhav, K. M. (2022). Photocatalytic Activity of Nickel Ferrite Nanoparticles Synthesized via Sol-Gel Auto Combustion Method. In **Advanced Materials Research** (Vol. 1169, pp. 123-127). Trans Tech Publications Ltd.
- 2) Andhare, D., Jadhav, S., **Mangesh V. Khedkar**, Somvanshi, S. B., More, S., & Jadhav, K. (2020). Structural and chemical properties of ZnFe₂O₄ nanoparticles synthesised by chemical co-precipitation technique. Paper presented at the **Journal of Physics: Conference Series**.
- 3) Bajaj, S. N., Raut, A., **Mangesh V. Khedkar**., Babrekar, M., Shinde, S., & Jadhav, K. (2021). Facile synthesis, structure and infrared properties of CoFe₂O₄ ferrite nanoparticles (CFN). Paper presented at the AIP Conference Proceedings.
- 4) Bhagwat, V., **Mangesh V. Khedkar**., Kulkarni, G., Kharat, P. B., & Jadhav, K. (2020). Dextrose assisted sol-gel auto combustion synthesis and magnetic characterizations of cobalt ferrite nanoparticles. Paper presented at the **AIP Conference Proceedings**.
- 5) Gopale, S. B., Borade, R. M., Raut, A., **Mangesh V. Khedkar**., Rajmane, S., & Jadhav, K. (2021). Synthesis, structural and magnetic properties of NiFe_{1.96}Al_{0.02}Gd_{0.02}O₄ nanoparticles (NFAGO). Paper presented at the **AIP Conference Proceedings**.
- 6) Kalunge, S., Humbe, A. V., **Mangesh V. Khedkar**., More, S., Keche, A., & Pandit, A. (2020). Investigation on Synthesis, Structural and Electrical properties of Zinc Ferrite on Gamma Irradiation. Paper presented at the **Journal of Physics: Conference Series**.
- 7) Kulkarni, G. D., Raut, A., **Mangesh V. Khedkar**., Andhare, D., Patade, S., & Jadhav, K. (2021). Structural and magnetic properties of NiFe₂O₄ NPs using clove assisted green synthesis technique. Paper presented at the **AIP Conference Proceedings**.
- 8) More, S., **Mangesh V. Khedkar**, Jadhav, S., Somvanshi, S. B., Humbe, A., & Jadhav, K. (2020). Wet chemical synthesis and investigations of structural and dielectric properties of BaTiO₃ nanoparticles. Paper presented at the **Journal of Physics: Conference Series**.
- 9) Patil, P. D., Jadhav, S. A., **Mangesh V. Khedkar**., Raut, A., Kavade, R., & Jadhav, K. (2021). Sol-Gel auto-combustion, structural, photo-catalytic activity and UV-VIS study of Co_{1-x}Zn_xFe_{2-y}Ce_yO₄ NPs (x= 0.3, y= 0.04). Paper presented at the **AIP Conference Proceedings**.
- 10) Patil, P. D., Parlikar, R., **Mangesh V. Khedkar**., Raut, A., Jadhav, K., & Kavade, R. (2021). Sol-Gel synthesis, structural characterizations, photo-catalytic degradation for H₂ production and UV-Absorption of yttrium-substituted Co-Zn ferrite nanoparticles. Paper presented at the **AIP Conference Proceedings**.

Conference Attended

- 1) National conference on nanostructured materials and nanotechnology, Shri Muktanand College Gangapur, 1st December 2018.
- 2) DAE Solid State Physics Symposium 2018: Hisar, Haryana, India, 18-22 December 2018.

- 3) National conference on Exploring trends in nanoscience (ETIN-2019), Anandrao Dhonde College, Kada 16-17 March 2019.
- 4) DAE Solid State Physics Symposium 2019: IIT Jodhpur, Rajasthan, 18-22 December 2019.
- 5) International web conference on advanced materials science and nanotechnology (NANOMAT-2020), Vinayak Vidnyan Mahavidyalaya Nandgaon Khandeshwar, Amravati 20-21 June 2020.
- 6) National e-conference on recent advances in materials sciences and nanotechnology, Yeshwantrao Chavan College of Arts, commerce and sciences, Sillod, Aurangabad, 1-2 August 2020
- 7) International web conference on advanced materials science and nanotechnology (NANOMAT-2020), Vinayak Vidnyan Mahavidyalaya Nandgaon Khandeshwar, Amravati 23-24 November 2021.
- 8) International Conference on New Horizons in Material Science and Nanotechnology (ICNHMSN- 2022), Yeshwantrao Chavan College of Arts, commerce and sciences, Sillod, Aurangabad, 24-25 June 2022

Workshops/ Courses Attended

- 1) One Day Intellectual Property Right Workshop On "Patents-Why, What, How?" organized by RUSA-Centre for Advanced Sensor Technology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (M.S.) (30 December 2016)
- 2) Attended course at Jawaharlal Nehru University, New Delhi on Advanced Electron Microscopy for Material Science, (13-22 March 2018)
- 3) Attended Lecture Series on Magnetism at UGC-DAE CSR Indore (27-31 August 2018)
- 4) One Day Workshop on Atom probe tomography and its application held at SAIF/CRNTS, IIT Mumbai, (3rd December 2018)

References

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