Manoranjan Behera, Ph.D.

Designation : Professor
Department : Department of Basic Science and Humanities (JOINED THE INSTITUTE ON 17TH JUNE 2002)
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Research Interests:

NOBLE METAL AND OXIDE NANOMATERIALS; FULLERENE NANOFLUIDS

- Green Synthesis and Characterization of Noble Metal Nanoparticles for Biomedical Applications.
- Green Synthesis and Characterization of Metal Oxide Nanoparticles for Photocatalytic Applications.
- Development of Fullerene Nanofluids in Aqueous and Non-Aqueous Media & Their Characterization.
- Synthesis and Characterization of Polymer Nanocomposites.

Academic Qualifications:

Ph. D. (Nanomaterials): IIT Kharagpur, India
M. Tech: IT, BHU, India
M. Sc. (Chemistry): Berhampur University, India
Specialization: Materials Science
CSIR-NET-L (2000) qualifier

Teaching Experience/ Industrial Experience/ Research Experience:

Lecturer (Chemistry): ITB, Bhubaneswar (1999-2002)
Lecturer (Chemistry): Basic Sc. College, OUAT (April' 2002)

PUBLICATIONS

Journal Articles

1. **Behera, M.** and Ram, S. (2012), Solubilization and stabilization of fullerene C_{60} in presence of poly (vinyl pyrrolidone) molecules in water. *Journal of Inclusion Phenomena and Macrocyclic Chemistry (Springer)*, 72(1-2), 233–239, IF:1.095.

2. **Behera, M.** and Ram, S. (2012), Synthesis of gold nanoparticles in presence of poly (vinyl pyrrolidone) from gold hydroxide precursor salt, *Advanced Materials Research (Trans Tech Publication),* 585, 115−119.
3. **Behera, M.** and Ram, S. (2013), Synthesis and characterization of core-shell gold nanoparticles with poly (vinyl pyrrolidone) from a new precursor salt. *Applied Nanoscience* (*Springer*), 3(1), 83-87**,** IF: 3.325.
4. **Behera, M.** and Ram, S. (2013), Intense quenching of fluorescence intensity of poly (vinyl pyrrolidone) molecules in presence of gold nanoparticles. *Applied Nanoscience (Springer),* 3(6)**,**543−548, IF: 3.325.
5. **Behera, M.** and Ram, S. (2013), Spectroscopic based study on the interaction between gold nanoparticle and poly(vinyl pyrrolidone) molecules in a non-hydrocolloid, *International Nano Letters* (Springer), 3,(17) (7 pages), **cited in nature.com.**
6. **Behera, M.** and Ram, S. **(2014),** Inquiring the mechanism of formation, encapsulation, and stabilization of gold nanoparticles by Poly (vinyl pyrrolidone) molecules in 1-butanol. *Applied Nanoscience* (Springer), 4(2), 247−254, IF: 3.325 **cited in nature.com.**
7. **Behera, M.** And Giri. G. **(2014),** Green synthesis and characterization of cuprous oxide nanoparticles in presence of a bio-surfactant. *Materials Science-Poland* (Springer), 32(4), 702-708, IF: 0.61.
8. **Behera, M. (2015),** Low Temperature Assisted Wet Chemical Synthesis of Gold Hydrocolloids in Presence of a Macroscopic Ligand." *Applied Science and Advanced Materials International*, 1(3), 97 –101.
9. **Behera, M.** and Ram, S. **(2015),** Mechanism of solubilizing fullerene C_{60} in presence of poly(vinyl pyrrolidone) molecules in water. *Fullerenes, Nanotubes & Carbon Nanostructures* (Taylor & Francis), 23, 906-916, IF: 1.35.
10. **Behera, M. (2015),** An intensive study on the optical, rheological and electrokinetic properties of polyvinyl alcohol - capped nanogold. *International Nano Letters* (Springer), 5, 161-169.
11. **Behera, M.** and Ram, S. **(2015),** Poly (vinyl pyrrolidone) mediated solubilization and stabilization of fullerene C_{60} in the form of nanofluid in an alcoholic medium. *Fullerenes, Nanotubes & Carbon Nanostructures* (Taylor & Francis), 23, 1064-1072, IF: 1.35.
12. **Behera, M. (2015),** Proposing a feasible mechanism to support the exhibition of superb colloidal stability of gold nanoparticles with poly (vinyl pyrrolidone) in the form of a nanofluid in N,N'-dimethyl formamide. *Research Journal of Nanoscience and Nanotechnology* (Knowledgia Scientific Publisher, Malaysia), 5(2), 60–73.
13. **Behera, M.** and Ram, S. **(2015),** "Tuning the optical and rheological properties of fullerene C_{60}/poly(vinyl pyrrolidone) nanofluids via inclusion of nanogold", *Plasmonics*(Springer), 11(4), 1057-1065, IF: 2.139.
14. **Behera, M.** and Ram, S**. (2015),** Variation of optical properties, rheology, and microstructure in fullerene/poly(vinyl pyrrolidone) nanofluids with fullerene content in n-butanol, *Fullerenes, Nanotubes & Carbon Nanostructures*(Taylor & Francis)**,** 24(2), 154-161, IF:1.35.
15. **Behera, M.** and Giri. G. **(2016),** Inquiring the photocatalytic activity of cuprous oxide nanoparticles synthesized by a green route on methylene blue dye. *International Journal of Industrial Chemistry* (Springer Publication), 2, 157-166**.**

16. **Behera, M.** and Ram, S. (**2017)**, Strongly optical absorptive nanofluids and rheology in bonded fullerene C60 via poly(vinyl pyrrolidone molecules in water, *Fullerenes, Nanotubes & Carbon Nanostructures* (Taylor & Francis), 25, 143-150, IF: 1.35.

17. **Behera, M.** and Ram, S**. (2018),** Interaction between poly(vinyl pyrrolidone) PVPand fullerene C_{60} at the interface in PVP-C_{60} nanofluids–A spectroscopic study, *IOP Conf. Ser.: Materials Science and Engineering*(IOP Publishing)**,** 330(1), (012016.

18. **Behera, M. (2018),** Effect of fullerene content on the thermal, microstructure, and electrokinetic properties of fullerene/poly (vinyl pyrrolidone) nanofluids and nanocomposites. *IOP Conference Series: Materials Science and Engineering* (IOP Publishing), 410(1), 012009.

19. **Behera, M.** and Ram, S. **(2018)**, Effect of Fullerene (C_{60}) on Vibrational Spectra, Hydrodynamic Diameter, Zeta Potential and Microstructures of C_{60}/Poly(vinyl pyrrolidone) Nanofluids in Aqueous Medium, *Asian Journal of Chemistry*(Asian Publication Corporation), 30(11), 2472-2476.

20. Tripathy, B. B., **Behera, M.**, Rath, H., Mallick, P., & Mishra, N. C. **(2019).** Evolution of microstructure and optical properties of TiO2/Au nanocomposite. *Indian Journal of Pure & Applied Physics (IJPAP)*, *57*(2), 95-100.

21. Tripathy Arpita, **Behera, M**, Rout A. S., Biswal S. K., Phule A. D. **(2020),** Optical, Structural, and Antimicrobial Study of Gold nanoparticles Synthesized Using an Aqueous Extract of Mimusops elengi Raw Fruits, *Biointerface Research In Applied Chemistry*, 10(6), 7085 – 7096.

22. **Behera, M**., Biswal S.K., Panda Bhabani S., and Mohammed A., **(2020),** Study of Optical, Structural, Thermal and Dielectric Properties of Poly (vinylidene diflouride)/Cuprous Oxide Polymer Nanocomposites, *Asian Journal of Chemistry,* 32(1), 106-110.

23. **Behera, M.,** Ram, S. **(2020),** Synthesis and characterization of gold (Au): Fullerene (C60)-Poly (vinyl pyrrolidone) nanofluids in an alcoholic medium, *Indian Journal of Science and Technology,* 13(30), 2188-2192.

24. **Behera,M**., Biswal S.K.,Panda Bhabani S.,and Mohammed A.,(2020), Study of Optical, Structural, Thermal and Dielectric Properties of Poly(vinylidenediflouride)/Cuprous Oxide Polymer Nanocomposites, Asian Journal Of Chemistry, 32(1),106-110.

25. Jena, A., **Behera, M**., Routray, C. and Biswal, S.K., 2020. Fabrication, Characterization and Antibacterial Study of Polyvinyl alcohol/Cuprous Oxide Nanofluids and Polymer Nanocomposite Films. Oriental Journal of Chemistry, 36(4).

26. Biswal, S.K., **Behera, M**., Rout, A.S. and Tripathy, A., 2021. Green synthesis of silver nanoparticles using raw fruit extract of mimusops elengi and their antimicrobial study. Biointerface Research in Applied Chemistry 11(3), pp.10040-10051.

27. **Behera, M**., Biswal, S.K., Ahemad, M.A. and Panda, B.S., 2021. Demonstration of enhanced thermal stability, dielectric constant and low tangent loss by particle-reinforced silver/poly (vinylidene difluoride) polymer nanocomposites. Biointerface Research in Applied Chemistry, 11, pp. 12584-12595.

28. **Behera, M.,** 2022. Study of optical, thermal, mechanical and microstructural properties of fullerene/poly (vinylidene fluoride) polymer nanocomposites. Biointerface Research in Applied Chemistry, 3, p.13.

Book Chapters Published

1. **Behera, M.** and Ram, S. and Fetcht, H.-J. **(2013),** Processable Aqueous Dispersion of Fullerene C_{60}: A Nanofluid, In *Nanomaterials: Synthesis, characterization, and applications. Chapter-14,* Editors: A. K. Haghi, A. K. Zachariah, and N. Kalariakkal. Apple Academic Press, *Taylor & Francis group.*

Papers presented in International Conferences / Seminars

1. **Behera, M.** and Ram, S. (2010), Processable aqueous dispersion of fullerene C_{60}: A Nanofluid, "Int. Conference on Nanomaterials: Synthesis, Charcterization and Applications", Apr. 27-29, 2010, Mahatma Gandhi University, Kottayam, Kerala, India, IL-16, p. 16.
2. **Behera, M.** and Ram, S. (2010), Optical absorption and emission in fullerene C_{60} nanofluids in an organic medium, "Int. Conference on Advanced Materials, Manufacturing, Management and Thermal Sciences," Nov. 18-19, 2010, Siddaganga Institute of Technology, Tumkur, Karnataka, AM-30, p. 31.
3. **Behera, M.** and Ram, S. (2010), Probing the solution state interaction between poly (vinyl pyrrolidone) and fullerene C_{60} molecules in nanofluids by optical absorption, emission, and vibrational spectroscopy, "Int. Conference on Fundamental and Applications of Nanoscience & Technology," Dec. 9-11, 2010, Jadavpur University, West Bengal, India, P-095, p. 92.
4. **Behera, M.** and Ram, S. (2011), Development and characterization of fullerene C_{60}-based nanofluids with gold nanoparticles in presence of poly (vinyl pyrrolidone) molecules in an organic medium, "Int. Conference on Advances in Polymer Science and Rubber Technology: Challenges Towards 2020 and Beyond," Mar. 3-5, 2011, Indian Institute of Technology Kharagpur, p. 153.
5. **Behera, M.** and Ram, S. (2012), Synthesis of gold nanoparticles in presence of poly (vinyl pyrrolidone) from a new precursor salt, "Int. Conference on Advances in Materials and Processing: Challenges and Opportunities," Nov. 2-4, 2012, Indian Institute of Technology Roorkee, B06-26, p. 92.
6. **M. Behera** and S Ram **(2015),** Non-linear variations of optical absorption, emission, hydrodynamic diameter and rheology in gold doped fullerene nanofluids in an alcoholic medium, Int. Conference on Innovative Applications of Chemistry in Pharmacology & Technology (IC-IACPT), Feb. 6-8, 2015, Berhampur University, PP-108, p.151.
7. **M. Behera** and S Ram **(2015),** Optical, microstructure, and rheological properties in gold grafted fullerene-poly(vinyl pyrrolidone) nanofluids in n-butanol, Int. Conference on Frontier in Materials Science & Technology (ICFMST), Dec. 10-12, 2015, NIST, Berhampur, India.
8. Saikishore, V. P., Ojha, A. R., M**. Behera and** Biswal, S. K. **(2015),** Study on the effect of fullerene contents on the optical and structural properties of poly(vinylidene fluoride)/fullerene polymer nanocomposites (ICFMST), Dec. 10-12, 2015, NIST, Berhampur, India.

9. **M. Behera** and Ram S **(2017),** Optical, microstructure, and rheological properties in gold grafted fullerene-poly(vinyl pyrrolidone) nanofluids in water, Int. conference on Recent advances in Materials Chemistry (RAMC), Feb. 24-26, 2017, Utkal University.
10. **M. Behera (2017),** Effect of fullerene content on the thermal, microstructure, and electrokinetic properties of fullerene/poly(vinyl pyrrolidone) nanofluids and nanocomposites, conference on Advanced Engineering Materials, Sep. 21-23, 2017, GITA, Bhubaneswar.
11. **M. Behera (2018),** Synthesis and characterization of fullerene (C_{60})/Poly(vinyl pyrrolidone) nanofluids inan alcoholic medium, Int. Conference on Advancements in Polymeric Materials, Feb. 2-4, 2018, CIPET, Bhubaneswar.

Papers presented in National Conferences / Seminars

1. **Behera, M.** and Ram, S. **(2011),** In-situ synthesis of gold nanoparticles in aqueous fullerene C_{60} nanofluids in presence of poly(vinyl pyrrolidone) molecules, "National Conference on Sensors and Actuators: Science to Technology," Mar. 11-12, 2011, Central Glass & Ceramic Research Institute and Sensors Hub, Kolkata, India
2. **M. Behera (2012),** Synthesis of gold nanoparticles", 26th Annual conference of Orissa Chemical Society and National Seminar on "Chemistry in Technology", Dec. 8-9, 2012, Ravenshaw University, Odisha.
3. **M. Behera** and S Ram **(2014),** Study on optical absorption and emission in gold doped fullerene C_{60} nanofluids in an organic medium, 28th annual conference of Orissa Chemical Society and National Conference on Recent Trends in Materials Science, Dec.13-14, 2014, page-32, UN Autonomous College, Adaspur, Odisha.
4. **M. Behera** and G. Giri**, (2013), "**Synthesis and characterization of Cu_2O photo-catalyst in presence of a bio-surfactant"**,** CMDAYS, Aug. 29-31, 2013, NIT Rourkela.
5. **M. Behera et al.** "Synthesis and characterization of Au-TiO_2 nanocomposites. NSRAP-14, May 5-6, 2014, Berhampur University.
6. **M. Behera** and G. Giri **(2014),** Photocatalytic degradation of methylene blue dye in presence of cuprous oxide nanoparticles synthesized using Calotropis gigantian leaves extract", National seminar on Recent Advancement in Materials Science (RAIMS 2014), Aug. 23-24, 2014,VSSUT, Burla, Odisha, p.54.
7. **M. Behera** and S Ram, **(2014),** Low temperature synthesis of gold nanofluids from gold hydroxide precursor salt in presence of a macroscopic ligand in water", National seminar on Recent Advancement in Materials Science (RAIMS 2014), Aug. 23-24, 2014, p.53,VSSUT, Burla, Odisha.
8. **M. Behera (2016),** Study on photocatalytic activity of cuprous oxide nanoparticles synthesized via a green route, National Seminar on Science & Technology for Indigenous Development in India, Dec. 9-11, 2016, KIIT University, Bhubaneswar.
9. **M. Behera (2016),** "Green synthesis and characterization of gold nanoparticles using an aqueous extract of *Wadelia Trilobata,* 30th Annual conference of Orissa Chemical Society," Dec. 24 – 25, 2016, abstarct-75, p.88, KIIT University.

10. **M. Behera (2017),** Development of fullerene/PVA polymer nanocomposites films via solution casting and their characterization, National seminar on Reaching the unreached through Science & Technology, ISCA, Bhubaneswar Chapter, Dec. 17-18, 2017, KIIT University.

Participated in Conferences / Seminars / FDP / Workshop

1. FDP on Recent Trends in Chemical Sciences, Auro University, Gujrat, 24-29 Aug. 2020.
2. International Conference on Emerging Smart Materials in Applied Chemistry, KIIT University, 10-12 Aug. 2020.
3. FDP on DIKSHARAMBH, NIT Patna, 10-14 Aug. 2020.
4. International Webinar on Bio-analytical Chemistry, Udayanath Autonomous College, 3 Jul.2020.
5. FDP on Application of remote sensing and GIS in Civil Engg, SIT Sambalpur, 7-10 Jul. 2020.
6. International Webinar on An overview of Climate Change Assessment, GIET, BBSR, 20 Jun. 2020.
7. State level Seminar on Current Environmental issues and challenges, Silicon Inst. Of Tech, BBSR, 24 Mar. 2018.
8. International workshop on advanced materials, NIST, Berhampur, 19-21 Dec. 2017.
9. National seminar on Science and Technology for Environmental Security, KIIT University, 25-26 Nov. 2017.
10. National seminar on Science and Technology for National Development in India, ISCA, Bhubaneswar Chapter, KIIT University, 12-13 Dec. 2016.
11. State level seminar on Emerging Trends in Environmental Pollution and its control, Silicon Inst of Tech, Bhubaneswar, 8 Dec. 2015.
12. Two week ISTE STTP on Environmental Studies conducted by IIT Bombay from 2 – 12 Jun. 2015.
13. Two-week ISTE STTP on Technical Communication conducted by IIT Bombay from 8 Oct. to 5 Dec. 2015.
14. State level workshop on Advancement in equipment and instrumentation for ferrous and nonferrous materials, C V Raman Engg College, 13 Mar. 2013.
15. National Seminar on Innovations in Science & Technology for Inclusive development, Inst of Physics, Bhubaneswar, 23-24 Nov. 2013.
16. QIP Short term Course on materials engineering and Industrial Application: Hybrid Nanocomposites for Photonics, Energy and Electronics Devices, IIT Kharagpur, 11- 22 Nov. 2013.
17. National workshop on New and Nano Materials, Inst of Materials Science, Bhubaneswar, 20-21 Jan. 2012.
18. National seminar on Research & Development relating to Medicinal plants, Trident Academy of Tech, Bhubaneswar, 30 May 2012.
19. National conference on Future Trends in information and communication technology & applications, Silicon Inst. of Tech, Bhubaneswar, 10-11 Sept. 2011.

20. State level Seminar on Professional ethics & Human values for engineers, Silicon Inst of Tech, 23-24 Dec. 2011.
21. Staff Development Programme on processing and Properties evaluation of engineering plastics & Effective utilization in transport sector, CIPET Bhubaneswar, 28 Nov. to 9 Dec. 2011.
22. International workshop on Mesoscopic, nanoscopic and macroscopic Materials, Inst. of Materials Science, Bhubaneswar, 2-4 Jan. 2008.
23. Staff Development Programme on Characterization Techniques and processing of Engineering Plastics, CIPET Bhubaneswar, 26 Mar. to 6 Apr. 2007.
24. Staff Development Programme on Recent advances in Manufacturing & Characterization of Reinforced polymer composites, CIPET Bhubaneswar, 12- 25 Apr. 2007.
25. State level workshop on Excellence in Teaching, Silicon Inst of Tech, 25 Nov. to 2 Dec. 2005.
26. State level seminar on Communication for Professional: Needs, Goals & Strategies, Silicon Inst of Tech, 7 Nov. 2004.
27. Induction training, Technical teachers's training Institute, Eastern region, India (2004), Silicon Inst. of Technology, 5-9Apr. 2004.
28. Specialised managerial training Course in production and Materials, Small Industries service Institute, Ministry of Industry, at IT, BHU, 8-22 Feb. 1997.