



## Manoranjan Behera, Ph.D.

**Designation : Professor**

**Department :** Department of Basic Sciences and Humanities  
(JOINED THE INSTITUTE ON 17<sup>TH</sup> JUNE' 2022)

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### RESEARCH INTERESTS

- ✓ Synthesis and characterizations of metal and Metal oxide Nanomaterials
- ✓ Synthesis and characterizations of Polymer Nanocomposites
- ✓ Synthesis and characterizations of Fullerene Nanofluids

### Academic Qualifications

- Ph.D., IIT Kharagpur
- M.Tech., IT BHU (Now IIT BHU)
- M.Sc., Berhampur University

### Awards Received

- BPUT Research Award, 2020
- CSIR(NET)-L, 2000
- GATE-95 & 96

### Teaching Experience/Industrial Experience/Research Experience

- Lecturer, ITB, Bhubaneswar (1999-2002)
- Lecturer, Basic Science College, OUAT, BBSR (Feb. to April'2002)

## PUBLICATIONS

### JOURNAL ARTICLES & CONFERENCE PAPERS

1. **Behera, M.** and Ram, S. (2012), Solubilization and stabilization of fullerene C<sub>60</sub> 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(vinylpyrrolidone) molecules in a nonhydrocolloid, *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*, 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<sub>60</sub> 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 poly(vinyl alcohol)-capped nanogold. *International Nano Letters (Springer)*, 5, 161-169.
11. **Behera, M.** and Ram, S. (2015), Poly(vinylpyrrolidone) mediated solubilization and stabilization of fullerene C<sub>60</sub> 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 supercolloidal 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 (Knowledge Scientific Publisher, Malaysia)*, 5(2), 60–73.
13. **Behera, M.** and Ram, S. (2015), “Tuning the optical and rheological properties of fullerene C<sub>60</sub>/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(vinylpyrrolidone) 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 C<sub>60</sub> via poly(vinylpyrrolidone) 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(vinylpyrrolidone) PVP and fullerene C<sub>60</sub> at the interface in PVP-C<sub>60</sub> nanofluids– A spectroscopic study, *Materials Science & Engg., IOP Conf. Series*, 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 & Engg.*, 410(1),012009.
19. **Behera, M.** and Ram, S. (2018), Effect of Fullerene (C<sub>60</sub>) on Vibrational Spectra, Hydrodynamic Diameter, Zeta Potential and Microstructures of C<sub>60</sub>/Poly(vinyl pyrrolidone) Nanofluids in Aqueous Medium, *Asian Journal of Chemistry*(Asian Publication Corporation), 30(11), 2472-2476.
  20. n Tripathy, B.B., **Behera, M.**, Rath, H., Mallick, P., & Mishra, N.C. (2019). Evolution of microstructure and optical properties of TiO<sub>2</sub>/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.**, Ram, S. (2020), Synthesis and characterization of gold (Au): Fullerene (C<sub>60</sub>)-Poly (vinyl pyrrolidone) nanofluids in an alcoholic medium, *Indian Journal of Science and Technology*, 13(30), 2188-2192.
  23. **Behera, M.**, Biswal S.K., Panda Bhabani S., and Mohammed A., (2020), Study of Optical, Structural, Thermal and Dielectric Properties of Poly(vinylidene difluoride)/Cuprous Oxide Polymer Nanocomposites, *Asian Journal Of Chemistry*, 32(1), 106-110.
  24. 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).
  25. 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.
  26. **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.
  27. **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 CHAPTER

1. **Behera, M.** and Ram, S. and Fetcht, H.-J. (2013), Processable Aqueous Dispersion of Fullerene C<sub>60</sub>: 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<sub>60</sub>: A Nanofluid, "Int. Conference on Nanomaterials: Synthesis, Characterization 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<sub>60</sub>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. **M. Behera** and S Ram (2015), Optical, microstructure, and rheological properties in gold grafted fullerene-poly(vinyl pyrrolidone) nanofluids in butanol, Int. Conference on Frontier in Materials Science & Technology (ICFMST), Dec. 10-12, 2015, NIST, Berhampur, India.
4. 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.
5. **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
6. **Behera, M.** and Ram, S. (2010), Probing the solution state interaction between poly (vinyl pyrrolidone) and fullerene C<sub>60</sub> 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.
7. **Behera, M.** and Ram, S. (2011), Development and characterization of fullerene C<sub>60</sub>-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.
8. **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.
9. **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.
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<sub>60</sub>)/Poly(vinyl pyrrolidone) nanofluids in a Conference on Advancements in Polymeric CIPET, Bhubaneswar. Feb. 2-4, 2018, BBSR

### Papers Presented in National Conferences/Seminars

1. **Behera, M.** and Ram, S. (2011), In-situ synthesis of gold nanoparticles in aqueous fullerene C<sub>60</sub> nanofluids in presence of poly(vinyl pyrrolidone) molecules, “National Conference on Sensors and Actuators: Science to Technology” held during 11-12<sup>th</sup>

March 2011 at Central Glass & Ceramic Research Institute and Sensors Hub, Kolkata, India

2. **M. Behera (2012)**, Synthesis of gold nanoparticles”, 26<sup>th</sup> annual conference of Orissa Chemical Society and National Seminar on “Chemistry in Technology”, 8-9<sup>th</sup> December, Ravenshaw University, Odisha
3. **M. Behera and S Ram (2014)**, Study on optical absorption and emission in gold doped fullerene C<sub>60</sub> nanofluids in an organic medium, 28<sup>th</sup> annual conference of Orissa Chemical Society and National Conference on Recent Trends in Materials Science, at UN Autonomous College, Adaspur, Odisha, RTMS-2014, **13-14 December.**, page-32.
4. **M. Behera and G. Giri, (2013)**, “Synthesis and characterization of Cu<sub>2</sub>O photocatalyst in presence of a bio-surfactant”, CMDAYS, NIT Rourkela, 29-31 August.
5. **M. Behera et al.** “Synthesis and characterization of Au-TiO<sub>2</sub> nanocomposites. NSRAP-14, Berhampur University, 5-6 May, 2014.
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), **23-24 August**, VSSUT, Burla, Odisha, Page-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), **23-24 August**, VSSUT, Burla, Odisha, Page-53.
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, KIIT University, Bhubaneswar, 9-11<sup>th</sup> Dec. 2016.
9. **M. Behera (2016)**, “Green synthesis and characterization of gold nanoparticles using an aqueous extract of *Wadelia Trilobata*, 30<sup>th</sup> Annual conference of Orissa Chemical Society” 24<sup>th</sup>-25<sup>th</sup> December 2016, KIIT University. Abstarct-75, Page-88.
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, KIIT University, 17-18<sup>th</sup> Dec. 2017.

## Participated in Conferences/Seminars/ FDP/Workshop

1. National webinar on the occasion of World Environment Day organised by SOA University, Odisha, 5th June 2024.
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 Bioanalytical Chemistry, Udayanath Autonomous college, 3rd July 2020.
5. FDP on Application of Remote sensing and GIS in Civil Engg, SIT Sambalpur, 7-10 July 2020.

6. International Webinar on An overview of Climate Change Assessment, GIET, BBSR, 20th June 2020.
7. State level Seminar on Current Environmental issues and challenges, Silicon Inst. Of Tech, BBSR, 24<sup>th</sup> March 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, Nov. 25-26, 2017.
10. National seminar on Science and Technology for National Development in India, ISCA, Bhubaneswar Chapter, KIIT University, 12-13<sup>th</sup> Dec. 2016.
11. State level seminar on Emerging Trends in Environmental Pollution and its control, Silicon Inst Of Tech, BBSR, 8<sup>th</sup> Dec, 2015.
12. Two week ISTE STTP on Environmental Studies conducted by IIT Bombay from 2<sup>nd</sup> June to 12<sup>th</sup> June 2015.
13. Two-week ISTE STTP on Technical Communication conducted by IIT Bombay from 8 Oct. to 5<sup>th</sup> Dec. 2015.
14. State level workshop on Advancement in equipment and instrumentation for ferrous and nonferrous materials, C V Raman Engg College, 13<sup>th</sup> march 2013.
15. National Seminar on Innovations in Science & Technology for Inclusive development, Inst Of Physics, Bhubaneswar, Nov 23-24, 2013.
16. QIP Short term Course on materials engineering and Industrial Application: Hybrid Nanocomposites for Photonics, Energy and Electronics Devices, IIT Kharagpur, 11/11/2013 to 22/11/2013.
17. National workshop on New and Nano Materials, Inst of Materials Science, BBSR, Jan. 20-21, 2012.
18. National seminar on Research & Development relating to Medicinal plants, Trident Academy of Tech, BBSR, 30<sup>th</sup> May-2012.
19. National conference on Future Trends in information and communication technology & applications, Silicon Inst Of Tech., Sept.10-11-2011.
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 BBSR, 28/11/2011 to 09/12/2011.
22. International workshop on Mesoscopic, nanoscopic and macroscopic Materials, Inst of Materials Science, BBSR, 2-4 Jan.-2008.
23. Staff Development Programme on Characterization Techniques and processing of Engineering Plastics, CIPET BBSR, 26/03/2007 to 06/04/2007.
24. Staff Development Programme on Recent advances in Manufacturing & Characterization of Reinforced polymer composites, CIPET BBSR, 12/04/2007 to 25/04/2007.
25. State level workshop on Excellence in Teaching, Silicon Inst Of Tech., 25<sup>th</sup> Nov-2<sup>nd</sup> Dec-2005.
26. State level seminar on Communication for Professional: Needs, Goals & Strategies, Silicon Inst Of Tech, 7<sup>th</sup> Nov-2004.
27. Induction training, Technical teachers's training Institute, Eastern region, India (2004), Silicon Inst. Of Technology, 05/04/2004 to 09/04/2004.
28. Specialised managerial training Course in production and Materials, Small Industries service Institute, Ministry of Industry, at IT, BHU, 08/02/1997 to 22/02/1997.