

Profile

NAOREM SHANTA SINGH, M.Sc., Ph.D.

Assistant Professor (23-9-2013 to date)

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Date of Birth: 1st February, 1980



Research Interests:

- ❖ Development of green, red and white nanophosphors for blue and UV LED pumped white LEDs for solid state lighting application.
- ❖ Luminescent nanophosphors for heavy metal sensing & anti-counterfeit applications.
- ❖ Development of lanthanide activated nanophosphors for display & biological applications.

Academic Qualifications:

❖ **Doctor of Philosophy (Ph. D.)**

(Materials Science)

Title of Thesis : Synthesis and photoluminescence studies of $MVO_4:Ln^{3+}$ ($M = Gd, Y$ & $Ln^{3+} =$ Lanthanide ions) and CdX ($X = S, Se$) nanocrystals and thin films

Institute : Manipur University, Imphal, Manipur, India

Graduation : 2011

❖ **Master of Science (M. Sc.)**

(Physics with Condensed Matter Physics Specialization)

Institute : Manipur University, Imphal, Manipur, India

Graduation : 2005

Research Experiences:

- ❖ Postdoctoral Fellow at IIT Bombay (28-02-2012 to 19-09-2013)

Research Projects implemented as Principal Investigator

- Development of rare earth oxide nanophosphors for UV LED pumped white light emission for lighting applications (2014). Sponsoring Agency: University Grants Commission, New Delhi. Amount: ₹ **6 Lakh. Completed**
- Development of green and red emitting nanophosphors for blue LED pumped white light emission for lighting (2015). Sponsoring Agency: Science and Engineering Research Board (SERB-DST), New Delhi. Amount: ₹ **44.94 Lakh. Completed**
- Development of lanthanide activated luminescent nanocrystals as fluorescent probe for sensing heavy metal ions (2019). Sponsoring Agency: Science and Engineering Research Board (SERB-DST), New Delhi. Amount: ₹ **49.18 Lakh. Completed**
- Designing simultaneously down and upconverted lanthanide activated luminescent based security ink for anti-counterfeiting applications (2022). Sponsoring Agency: Science and Engineering Research Board (SERB-DST), New Delhi. Amount: ₹ **33.34 Lakh. Ongoing**

Ph.D. Supervised:

Awarded: 3

- Ms. Takhe Yaba (Awarded on 14-6-2022); Title: Investigation of Photoluminescence and Energy transfer mechanisms in Lanthanide activated Tungstate and Niobate based Nanophosphors
- Mr. Ranjoy Wangkhem (Awarded on 15-12-2022); Title: Investigation on lanthanide activated luminescent nanocrystals for lighting and sensing applications
- Mr. Oinam Shantajit Singh (Awarded on 15-12-2022); Title: Study on Photoluminescence Properties of unsensitized and Bi^{3+} sensitized $M_2O_3:Ln^{3+}$ ($M = Gd, Y$ & $Ln^{3+} = Eu^{3+}, Sm^{3+}$)

Ongoing: 3

- Mr. Kedrukho Khufpho (2021); Title: Luminescence properties Sensitized phosphors
- Mr. Medenmeren Longchar (2022); Title: Luminescence properties Sensitized WO_4 and MoO_4 based phosphors.
- Ms. Watisenla Sangtam (2022); Title: Luminescence of Sensitized vanadate and phosphate based phosphors.

Publications in Journals:

1. O. Shantajit Singh, R. Wangkhem, N. Yaiphaba, [N. Shanta Singh*](#) *Hydrothermally synthesized rod shaped $Y_2O_3:Eu^{3+}$ as red emitter*, *Phys. B: Condens.* **670** (2023) 415409. DOI: <https://doi.org/10.1016/j.physb.2023.415409>
2. R. Wangkhem, O. Shantajit Singh, [N. Shanta Singh*](#) *Hydrothermal Synthesis of Rod Shaped Red Emitting $Gd_2O_3:Eu^{3+}$ Phosphor*, *J. Fluoresc.* (2023) DOI: <https://link.springer.com/article/10.1007/s10895-023-03349-2>
3. O. Shantajit Singh, R. Wangkhem, N. Yaiphaba, Th. David Singh, [N. Shanta Singh*](#), *Bi^{3+} sensitized $Gd_2O_3:Eu^{3+}$: A potential red phosphor for UV LED pumped white light emission*, *J. Alloys Compd.*, **905** (2022) 163831. DOI: <https://doi.org/10.1016/j.jallcom.2022.163831>
4. R. Wangkhem, T. Yaba, R. S. Ningthoujam, [N. Shanta Singh*](#), *Surface functionalized $GdVO_4:Eu^{3+}$ nanocrystals as turn-off luminescent probe for selective sensing of Cu^{2+} ions: role of pH*, *Appl. Surf. Sci.*, **563** (2021) 1530350. DOI: <https://doi.org/10.1016/j.apsusc.2021.150350>
5. O. Shantajit Singh, R. Wangkhem, [N. Shanta Singh*](#), *Excitation and activator concentration induced colour tuning and white light generation from Bi^{3+} sensitized $Y_2O_3:Eu^{3+}$: Energy transfer studies*, *J. Alloys Compd.*, **875** (2021) 160059. DOI: <https://doi.org/10.1016/j.jallcom.2021.160059>
6. T. Yaba, R. Wangkhem, [N. Shanta Singh*](#) et al., *Enhanced red emission from Bi^{3+} sensitized $CaWO_4:Eu^{3+}$ as red component for near UV/blue LED pumped white light emission*, *J. Alloys Compd.*, **843** (2020) 156022-156031. DOI: <https://doi.org/10.1016/j.jallcom.2020.156022>
7. T. Yaba, R. Wangkhem, [N. Shanta Singh*](#), *Photoluminescence Properties of Dy^{3+} Activated $CaWO_4$ Nanophosphors: a Potential Single Phase near White Light Emitter*, *J. Fluorescence*, **29** (2019) 435-443. DOI: <https://link.springer.com/article/10.1007/s10895-019-02352-w>
8. R. Wangkhem, N. Premananda Singh, S. D. Singh, L. R. Singh, [N. Shanta Singh*](#), *Facile synthesis of re-dispersible $YVO_4:Ln^{3+}$ ($Ln^{3+} = Dy^{3+}, Eu^{3+}, Sm^{3+}$) nanocrystals: Luminescence studies and sensing of Cu^{2+} ions*, *J. Lumin.* **203** (2018) 341-348. DOI: <https://doi.org/10.1016/j.jlumin.2018.06.064>
9. R. Wangkhem, T. Yaba, R. S. Ningthoujam, [N. Shanta Singh*](#), *Red emission enhancement from $CaMoO_4:Eu^{3+}$ by co-doping of Bi^{3+} for near UV/blue LED pumped white pcLEDs: Energy transfer studies*, *J. Appl. Phys.*, **123** (2018) 124303-124312. DOI: <https://doi.org/10.1063/1.5021285>
10. [N. Shanta Singh*](#) et al., *Multicolour and nearly white light emission in $YP_{0.8}V_{0.2}O_4:Sm^{3+}$ nanorods: Controlled Energy transfer*, *J. Alloys Compd.*, **726** (2017) 1161. DOI: <https://doi.org/10.1016/j.jallcom.2017.08.099>
11. [N. Shanta Singh](#), N. K. Sahu, D. Bahadur, *Multicolor tuning and white light emission from lanthanide doped $YPVO_4$ nanorods*, *J. Mater. Chem. C*, **2**, (2014) 548. DOI: <https://doi.org/10.1039/C3TC31586J>
12. N. K. Sahu, [N. Shanta Singh](#), R. S. Ningthoujam, D. Bahadur, *Ce^{3+} sensitized $GdPO_4:Tb^{3+}$ nanorods: An investigation on energy transfer, luminescence switching, and quantum yield*, *ACS Photonics*, **1**, (2014) 337. DOI: <https://doi.org/10.1021/ph4001718>
13. N. K. Sahu, [N. Shanta Singh](#), L. Pradhan, D. Bahadur, *Ce^{3+} sensitized $GdPO_4:Tb^{3+}$ with iron oxide nanoparticles: a potential biphasic system for cancer theranostics*, *Dalton Trans.*, **43** (2014) 11728. DOI: <https://doi.org/10.1039/C4DT00792A>
14. A. Prakash, [N. Shanta Singh](#), D. Bahadur, *The photo-electrochemical studies of Eu^{3+} doped yttrium orthovanadate-zinc oxide-reduced graphene oxide nanohybrid*, *Mater. Chem. Phys.* **144**, (2014) 529. DOI: <https://doi.org/10.1016/j.matchemphys.2014.01.032>
15. [N. Shanta Singh](#), H. Kulkarni, L. Pradhan, D. Bahadur, *Multifunctional biphasic suspension of mesoporous silica encapsulated $YVO_4:Eu^{3+}$ and Fe_3O_4 nanoparticles: Synergistic effect towards cancer therapy and imaging*, *Nanotechnology*, **24** (2013) 065101. DOI: <https://doi.org/10.1088/0957-4484/24/6/065101>
16. R. S. Loitongbam, [N. Shanta Singh](#) W. R. Singh, R. S. Ningthoujam, *Observation of exceptional strong emission transitions 5D_j ($j=1-3$) to 7F_j ($j=1-3$): Multicolor from single Eu^{3+} ion doped La_2O_3 nanoparticles*, *Journal of Luminescence* **134** (2013) 14. DOI: <https://doi.org/10.1016/j.jlumin.2012.09.026>

17. R. S. Loitongbam, W. R. Singh, G. Phaomei, [N. Shanta Singh](#), Blue and green emission from Ce^{3+} and Tb^{3+} co-doped Y_2O_3 nanoparticles, *Journal of Luminescence* **140** (2013) 95. DOI: <https://doi.org/10.1016/j.jlumin.2013.02.049>
18. G. Phaomei, W. R. Singh, [N. Shanta Singh](#), R. S. Ningthoujam, *Luminescence properties of Ce^{3+} co-activated $LaPO_4:Dy^{3+}$ nanorods prepared in different solvents and tunable blue to white light emission from Eu^{3+} co-activated $LaPO_4:Dy^{3+}$, Ce^{3+}* , *Journal of Luminescence* **134** (2013) 649. DOI: <https://doi.org/10.1016/j.jlumin.2012.07.014>
19. K. G. Sharma, [N. Shanta Singh](#), Y. R. Devi, N. R. Singh and S. D. Singh, *Effects of Annealing on Luminescence of $CaWO_4:Eu^{3+}$ Nanoparticles and its Thermoluminescence Study*, *Journal of Alloys and Compounds* **556** (2013) 94. DOI: <https://doi.org/10.1016/j.jallcom.2012.12.087>
20. [N. Shanta Singh](#), R. S. Ningthoujam, G. Phaomei, S. Dorendrajit Singh, A. Vinu, R. K. Vatsa, *Re-dispersion and film formation of $GdVO_4:Ln^{3+}$ ($Ln^{3+} = Dy^{3+}, Eu^{3+}, Sm^{3+}, Tm^{3+}$) nanoparticles: particle size and luminescence studies*, *Dalton Transactions* **41** (2012) 4404. DOI: <https://doi.org/10.1039/C2DT12190E>
21. S. D. Meetei, S. D. Singh, [N. Shanta Singh](#), V. Sudarsan, R. S. Ningthoujam, M. Tyagi, S. C. Gadkari, R. Tewari, and R. K. Vatsa, *Crystal structure and photoluminescence correlations in white emitting nanocrystalline $ZrO_2:Eu^{3+}$ phosphor: Effect of doping and annealing*, *J. Lumin.* **132** (2012) 532. DOI: <https://doi.org/10.1016/j.jlumin.2011.09.011>
22. G. Phaomei, R. S. Ningthoujam, W. R. Singh, R. S. Loitongbam, [N. Shanta Singh](#), A. Rath, R. R. Juluri, *Synthesis of re-dispersible Ce^{3+} co-doped $LaPO_4:Tb^{3+}$ nanorods and effects of concentrations of Ce^{3+} or Tb^{3+} and reaction medium on luminescence properties: luminescence switching behavior through redox reaction and polymer films*, *Dalton Transactions*, **40** (2011) 11571. DOI: <https://doi.org/10.1039/C1DT11264C>
23. [N. Shanta Singh](#), W. Shambhunath Singh, Sh. Dorendrajit Singh, *Annealing effect on the dark electrical transport and absorbance spectra of chemical bath deposited CdS nanocrystallites*, *International Journal of Nanoscience* **1 & 2** (2011) 93. DOI: <https://doi.org/10.1142/S0219581X11007533>
24. R. S. Loitongbam, W. R. Singh, G. Phaomei, [N. Shanta Singh](#), *Studies On Electrodeposition Of Highly Oriented Three Dimensional ZnO Microarrays*, *AIP Conference Proceedings* **1276**, (2010) 100–106. DOI: <https://doi.org/10.1063/1.3504272>
25. [N. Shanta Singh](#), R. S. Ningthoujam, S. Dorendrajit Singh, B. Viswanadh, N. Manoj, R. K. Vatsa, *Preparation of highly crystalline blue emitting $MVO_4:Tm^{3+}$ ($M = Gd, Y$) spherical nanoparticles: Effects of activator concentration and annealing temperature on luminescence, lifetime and quantum yield*, *Journal of Luminescence* **130** (2010) 2452. DOI: <https://doi.org/10.1016/j.jlumin.2010.08.011>
26. N. Yaiphaba, R. S. Ningthoujam, [N. Shanta Singh](#), R. K. Vatsa, N. R. Singh, S. Dhara, N. L. Misra, R. Tewari, *Luminescence, lifetime, and quantum yield studies of redispersible Eu^{3+} -doped $GdPO_4$ crystalline nanoneedles: Core-shell and concentration effects*, *Journal of Applied Physics* **107** (2010) 034301. DOI: <https://doi.org/10.1063/1.3294964>
27. M. N. Luwang, R. S. Ningthoujam, [N. Shanta Singh](#), R. Tewari, S. K. Srivastava, R. K. Vatsa, *Surface chemistry of surfactant AOT-stabilized SnO_2 nanoparticles and effect of temperature*, *Journal of Colloid Interface Science* **349** (2010) 27. DOI: <https://doi.org/10.1016/j.jcis.2010.05.037>
28. G. Phaomei, W. R. Singh, R. S. Ningthoujam, [N. Shanta Singh](#), M. N. Luwang, R. Tewari, R. K. Vatsa, *Low temperature synthesis and luminescence properties of re-dispersible Eu^{3+} doped $LaPO_4$ nanorods by ethylene glycol route*, *Optical Materials* **32** (2010) 616. DOI: <https://doi.org/10.1016/j.optmat.2009.12.009>
29. N. Yaiphaba, R. S. Ningthoujam, [N. Shanta Singh](#), R. K. Vatsa, N. Rajmuhon Singh, *Probing of inversion symmetry site in Eu^{3+} -doped $GdPO_4$ by luminescence study: Concentration and annealing effect*, *Journal of Luminescence* **130** (2010) 174. DOI: <https://doi.org/10.1016/j.jlumin.2009.08.008>
30. [N. Shanta Singh](#), R. S. Ningthoujam, M. N. Luwang, S. D. Singh, R. K. Vatsa, *Luminescence, lifetime and quantum yield studies of $YVO_4:Ln^{3+}$ ($Ln^{3+} = Dy^{3+}, Eu^{3+}$) nanoparticles: Concentration and annealing effects*, *Chemical Physics Letters* **480** (2009) 237. DOI: <https://doi.org/10.1016/j.cplett.2009.09.006>
31. [N. Shanta Singh](#), R. S. Ningthoujam, N. Yaiphaba, S. D. Singh, R. K. Vatsa, *Lifetime and quantum yield studies of Dy^{3+} doped $GdVO_4$ nanoparticles: Concentration and annealing effect*, *Journal of Applied Physics* **105** (2009) 064303. DOI: <https://doi.org/10.1063/1.3082088>

32. L. R. Singh, R. S. Ningthoujam, [N. Shanta Singh](#), S. D. Singh, *Probing Dy³⁺ ions on the surface of nanocrystalline YVO₄: Luminescence study*, *Optical Materials* **32** (2009) 286. DOI: <https://doi.org/10.1016/j.optmat.2009.08.005>
33. [N. Shanta Singh](#), R. S. Ningthoujam, L. R. Devi, N. Yaiphaba, V. Sudarsan, S. D. Singh, R. K. Vatsa, R. Tewari, *Luminescence study of Eu³⁺ doped GdVO₄ nanoparticles: Concentration, particle size, and core/shell effects*, *Journal Applied Physics* **104** (2008) 104307. DOI: <https://doi.org/10.1063/1.3026612>
34. [N. Shanta Singh](#), W. S. Singh, S. D. Singh, G. S. Okram, *Preparation and Characterization of nanocrystalline CdSe*, *Ind. J. Phys.* **81** (2007) 225.
35. W. S. Singh, [N. Shanta Singh](#), A. Soni, S. D. Singh, L. R. Singh, G. S. Okram, *Characterisation of ZnS nanocrystals prepared by wet chemical method*, *Ind. J. Phys.* **81** (2007) 1267.

Workshop and Conference Attended and presented paper:

- ❖ National Conference on Smart Material for Future Technology, 29th & 30th November 2022 (North Eastern Hill University, Shillong).
- ❖ Emerging Research in Chemical Sciences, 11th & 12th April 2022 (Dhanamanjuri University, Imphal).
- ❖ International Conference on Luminescence and its Applications, 7th to 10th January, 2019 (Pandit Ravishankar Prasad University, Raipur).
- ❖ The 105th Indian Science Congress, 16th to 20th March 2018 (Manipur University, Imphal).
- ❖ National Seminar on Chemistry on Interdisciplinary Research, 16th & 17th March, 2017 (Nagaland University, Lumami).
- ❖ International Conference on Advanced Nanomaterial and Nanotechnology, 18th to 21st December, 2017 (Indian Institute of Technology Guwahati, Guwahati).
- ❖ National Conference on Recent Trends in Nanoscience & Nanotechnology, 8th & 9th September, 2016 (North Eastern Hill University, Shillong).
- ❖ National Conference on Frontiers of Chemical Sciences, 13th & 14th March, 2015 (Dhanamanjuri College of Sciences, Imphal).
- ❖ 2nd International Symposium on Hybrid Materials and Processing, HyMaP 2011, 27th to 29th October, 2011. (Busan, South Korea).
- ❖ 3rd International Symposium on Materials Chemistry (ISMC), 7th to 11th December, 2010. (Bhabha Atomic Research Centre, Mumbai).
- ❖ International Conference on Advanced Nanomaterials and Nanotechnology (ICANN), 9th to 11th December, 2009. (Indian Institute of Technology Guwahati, Guwahati).
- ❖ 2nd International Symposium on Materials Chemistry (ISMC), 2nd to 6th December, 2008. (Bhabha Atomic Research Centre, Mumbai).
- ❖ International Conference on Recent Trends in Nanoscience and Technology (ICRTNT), 7th to 9th December, 2006. (Jadavpur University, Kolkata, West Bengal).
- ❖ International Conference on Optoelectronic Materials and Thin films for Advanced Technology (OMTAT), 24th to 27th October, 2005. (Cochin University of Science and Technology, Kochi, Kerala).
- ❖ 1st Joint Meeting of the Associated International Laboratory & 3rd SERC Summer School on Solid State Chemistry. 17th June to 7th July, 2010 (IISc Bangalore, India).