

Sai Krishna Katla
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SUMMARY OF QUALIFICATIONS

- Over ten years of research experience in nanomaterials chemistry with expertise in developing novel synthesis methods for nanoparticles with desired shape, structure, and composition for varied applications.
 - Experienced in teaching chemistry undergraduates as a Lecturer at the University of Texas at El Paso. Adept in curriculum development, student advising and proficient with online and computer aided teaching techniques such as Blackboard and Moodle.
 - Published over 25 journal articles in high-impact journals (including JACS, ACS Nano, Angew. Chem.), 3 patents, 2 book chapters and a book in the field of nanotechnology.
 - Reviewer for international scientific journals: Carbon, Physical Chemistry Chemical Physics (PCCP), Nanotechnology Reviews, Journal of Nanoscience and Nanotechnology (JNN), Nanoscience and Nanotechnology Letters.
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EDUCATION AND EXPERIENCE

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| 2015 – Present | Research Associate (from May 2015) & Lecturer (from Jan 2017)
Department of Chemistry
University of Texas at El Paso, TX, USA
Supervisor: Prof. Juan C. Noveron |
| 2014 – 2015 | Research Scientist in the 3D-Nanostructuring Group
Institute of Physics & Institute of Micro- and Nanotechnologies (IMN)
Technische Universität, Ilmenau, Germany
Supervisor: Prof. Dr. Yong Lei |
| 2011 – 2014 | Postdoctoral Researcher at the Nanofabrication and Nanomaterials Facility
Center for Advanced Microstructures and Devices (CAMD)
Louisiana State University, Baton Rouge, LA, USA
Supervisor: Prof. Challa S. S. R. Kumar |
| 2005 – 2011 | Jawaharlal Nehru Center for Advanced Scientific Research (JNCASR), India.
Degree: Ph.D
Thesis: Nanoarchitecture: Morphogenesis and Applications of Nanostructured Materials.
Supervisor: Prof. Eswaramoorthy Muthusamy |

2000 – 2005

Sri Sathya Sai Institute of Higher Learning, India.

Degree: M.Sc (Chemistry), CGPA 4.80/5.00

Degree: B.Sc (Hons.) in Chemistry, CGPA 4.54/5.00

HONORS AND AWARDS

- ‘Inspire Faculty Award’ for the year 2015 by the Department of Science and Technology, Govt. of India.
 - Submitted research proposals as PI and Co-PI to funding agencies including Louisiana Board of Regents and Department of Homeland Security.
 - Won the ‘2014 Nano Today Cover Competition’ organized by Materials Today Journal, Elsevier Publications (Cover page of Nano Today, Volume 9, Issue 5, 2014).
 - Member of American Chemical Society.
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ACADEMIC RESEARCH SKILL SET

- Synthesis and functionalization of the nanoparticles for applications in catalysis, energy storage, bioanalysis, drug delivery and other applications.
- Characterization of inorganic and polymeric nanoparticles towards application in homogenous and heterogeneous catalysis, determination of size and zeta potential, estimation of lipid/polymer content, ligand density analysis, elemental composition analysis.
- Lab-on-a-chip based microfluidic and millifluidic flow-based synthesis of polymeric and inorganic nanoparticles for biomedical applications.
- SQUID-based measurement of magnetic properties of nanoparticles for application in magnetic resonance imaging and cancer therapy.
- In-vitro investigation of photothermal-applications of gold nanomaterials for targeting cancer cells.
- In-situ time-resolved characterization of nanoparticle growth using synchrotron-based X-ray absorption techniques for analyzing their atomic structure and composition.
- Investigation of the fundamental origins of anti-bacterial activity of silver and copper nanoparticles using the X-ray absorption techniques.
- Millifluidics-based continuous-flow catalysis applications of nanoparticles for the formation of biofuels from plant-based biomass.
- Trained in using clean room experimental standards and environment health and safety (EHS).

TECHNICAL EXPERIENCE:

- High performance liquid chromatography (HPLC) and gas chromatography (GC) based analysis of the reaction analytes, products during synthesis and catalysis experiments.
- Particle size and zeta potential measurements of nanoparticles through dynamic light scattering (DLS) technique to determine their hydrodynamic size and surface charge.

- Electron microscopy techniques such as scanning electron microscopy (SEM), transmission electron microscopy (TEM), atomic force microscopy (AFM) and elemental composition analysis techniques such as electron diffraction spectroscopy (EDS), electron-energy loss spectroscopy (EELS).
 - Analytical spectroscopic techniques such as UV-Visible, Fourier Transform-Infrared (FT-IR), Fluorescence, Photoluminescence, and Nuclear Magnetic Resonance (NMR).
 - Mass-spectrometric characterization (MALDI-TOF, ESI-MS) of polymeric and inorganic nanoparticles for estimation of their mass and size.
 - Brunauer–Emmett–Teller (BET) based surface area characterization of porous materials, pore-size and pore-volume analysis and adsorption of gases such as N₂, H₂, and CO₂ on nanomaterials.
 - Powder and single-crystal X-ray diffraction (XRD) techniques for the analysis of crystal structure of inorganic nanomaterials.
 - Thermogravimetric analysis (TGA) analysis for the estimation of organic/lipid and inorganic content of nanoparticle composition.
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TEACHING EXPERIENCE

- CHEM 2124: Laboratory for Organic Chemistry (Jan 2017 – Present)
 - Responsible for instructing the organic chemistry laboratory course for undergraduate students
 - Responsible for preparing the semester syllabus for the course
 - Responsible for preparation of pre-lab lectures and quizzes for instruction to the students
 - Responsible for grading the students for the semester based on their performance
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RESEARCH PUBLICATIONS

Google Scholar Page: <http://scholar.google.de/citations?user=PchVcRsAAAAJ&hl=en&oi=ao>

(a) Nanostructured Materials: Synthesis, Characterization & Applications:

1. **K. S. Krishna**, U. Mansoori, N. R. Selvi, and M. Eswaramoorthy, Form emerges from formless entities: Temperature-induced self-assembly and growth of ZnO nanoparticles into zeptoliter bowls and troughs, **Angew. Chem. Int. Ed.** 2007, 46, 5962-5965 (*This article appeared as popular publication on 'nanomedicine newsletter' and also on 'nanoarchitecture.net' website as research highlight*).
2. **K. S. Krishna**, and M. Eswaramoorthy, Novel synthesis of carbon nanorings and their characterization, **Chem. Phys. Lett.** 2007, 433, 327-330.
3. A. Ghosh, K. S. Subramanyam, **K. S. Krishna**, S. Dutta, A. Govindaraj, S. K. Pati, and C. N. R. Rao, Uptake of H₂ and CO₂ by graphene, **J. Phys. Chem. C** 2008, 112, 15704-15707.
4. **K. S. Krishna**, C. S. S. Sandeep, R. Philip, and M. Eswaramoorthy, Mixing does the magic: A rapid synthesis of high surface area noble metal nanosponges showing broadband nonlinear optical response, **ACS Nano** 2010, 4, 2681-2688.

5. **K. S. Krishna**, G. Vivekanandan, D. Ravinder, and M. Eswaramoorthy, ZnO: A versatile template to obtain unusual morphologies of silica, gold and carbon nanostructures, **Chem. Commun.** 2010, 46, 2989-2991.
6. **K. S. Krishna**, B.V.V.S. Pavan Kumar, and M. Eswaramoorthy, Nanopillar arrays of amorphous carbon nitride, **Chem. Phys. Lett.** 2011, 511, 87-90.
7. **K. S. Krishna**, B.V.V.S. Pavan Kumar, and M. Eswaramoorthy, Shaping up: Spontaneous formation of ordered mesoscopic salt bowls, **RSC Adv.** 2012, 2, 5947-5949.
(FESEM image of MnSO₄ salt bowls won the 2014 Nano Today Cover Competition:
<http://www.materialstoday.com/biomaterials/features/feSEM-image-of-mnso4-salt-microbowls/>)
(The article was highlighted in RSC Advances Journal blog by its Deputy Editor:
<http://blogs.rsc.org/ra/2012/06/15/mesoscopic-gold-bowls/>)
8. **K. S. Krishna**,* S. Maity, and K. K. R. Datta, Carbon spheres assisted synthesis of porous oxides with foam-like architecture, **J. Nanosci. Nanotech.** 2013, 13, 3121-3126 (*as corresponding author*).
9. K. Jayaramulu, **K. S. Krishna**, S. George, M. Eswaramoorthy, and T. K. Maji, Shape assisted fabrication of fluorescent cages of squarate based metal-organic coordination frameworks, **Chem. Commun.** 2013, 49, 3937-3939 (*The article was chosen as the front cover page of the Issue*).
10. D. K. Singh, **K. S. Krishna**, S. Harish, S. Sampath and M. Eswaramoorthy, No more HF: Teflon assisted ultrafast removal of silica to generate high surface area mesostructured carbon for enhanced CO₂ capture and supercapacitor performance, **Angew. Chem. Int. Ed.** 2016, 55, 2032-2036.

(b) Atomically-Precise Gold Nanoclusters:

11. J. Liu, **K. S. Krishna**, Y. Losovyj, S. Chattopadhyay, J. T. Miller, J. J. Spivey, and C. S. S. R. Kumar, Ligand-stabilized and atomically precise gold nanocluster catalysis: A case study for correlating fundamental electronic properties with catalysis, **Chem. Euro. J.** 2013, 19, 10201-10208.
12. **K. S. Krishna**, P. Tarakeshwar, V. Mujica, and C. S. S. R. Kumar, Chemically induced magnetism in atomically precise gold nanoclusters, **Small** 2014, 10, 907-911.
13. **K. S. Krishna**, M. He, D. A. Bruce, and C. S. S. R. Kumar, The enigma of Au₂₁(SC₂H₄Ph)₁₄ nanocluster: A synthetic challenge, **Nanotech. Rev.** 2014, 3, 311-317.
14. J. J. Spivey, **K. S. Krishna**, C. S. S. R. Kumar, K. M. Dooley, J. C. Flake, L. Haber, Y. Xu, M. J. Janik, S. B. Sinnott, Y. Cheng, T. Liang, D. S. Sholl, T. Manz, U. Diebold, G. Parkinson, D. Bruce, and P. de Jongh, Synthesis, characterization and computation of catalysts at the Center for Atomic-level Catalyst Design, **J. Phys. Chem. C**, 2014, 118, 20043-20069.
15. M. Hembury, C. Chiappini, S. Bertazzo, T. Kalber, G. L. Drisko, O. Ogunlade, S. W. Samuel, **K. S. Krishna**, C. Jumeaux, P. Beard, C. S. S. R. Kumar, A. E. Porter, M. F. Lythgoe, C. Boissière, C. Sanchez and M. M. Stevens, Gold-silica quantum rattles for multimodal imaging and cancer therapy, **Proc. Natl. Acad. Sci. USA**, 2015, 112, 1959-1964 (*This article was highlighted in the following research news websites:* <http://nanotechweb.org/cws/article/tech/60387> and <http://www.nanowerk.com/nanotechnology-news/newsid=38960.php>).

16. K. Katsiev, N. Lozova, L. Wang, **K. S. Krishna**, R. Li, W. Mei, S. E. Skrabalak, C. S. S. R. Kumar and Y. Losovyj, Electronic structure of Au₂₅ clusters: Between discrete and continuous, **Nanoscale**, 2016, 8, 14711-14715.
17. J. Liu, **K. S. Krishna**, C. Kumara, S. Chattopadhyay, T. Shibata, A. Dass, and C. S. S. R. Kumar, Understanding Au₉₈Ag₄₆(SR)₆₀ nanoclusters through investigation of their electronic and local structure by X-ray absorption fine structure **RSC Adv.**, 2016, 6, 25368-25374.
18. E. Andrews, **K. S. Krishna**, C.S.S.R. Kumar, M. Patterson, P. Sprunger and J. Flake, Electrocatalytic reduction of CO₂ at Au nanoparticle electrodes: Effects of interfacial chemistry on reduction behavior **J. Electrochem. Soc.** 2015, 162, Issue 12, F1373-F1378.

(c) Millifluidics/Lab-on-a-Chip Devices:

19. **K. S. Krishna**, C. V. Navin, S. Biswas, V. Singh, K. Ham, G. L. Bovenkamp C. S. Theegala, J. T. Miller, J. J. Spivey, and C. S. S. R. Kumar, Millifluidics for time-resolved mapping of the growth of gold nanostructures, **J. Am. Chem. Soc.** 2013, 135, 5450-5456.
20. **K. S. Krishna**, S. Biswas, D. G. Yamane, C. V. Navin, J. T. Miller, and C. S. S. R. Kumar, Millifluidics for chemical synthesis and time-resolved mechanistic studies, **J. Vis. Exp.** 2013, 81, e50711 (doi: 10.3791/50711).
21. **K. S. Krishna**, S. Li, Y. Li, and C. S. S. R. Kumar, Lab-on-a-chip synthesis of inorganic nanomaterials and quantum dots for biomedical applications, **Adv. Drug Deliv. Rev.** 2013, 65, 1470-1495.
22. C. V. Navin, **K. S. Krishna**, C. S. Theegala, and C. S. S. R. Kumar, Lab-on-a-chip devices for gold nanoparticle synthesis and their role as a catalyst support for continuous flow catalysis, **Nanotech. Rev.** 2014, 3, 39-63.
23. C. V. Navin, **K. S. Krishna**, G. L. Bovenkamp, J. T. Miller, S. Chattopadhyay, T. Shibata, Y. Losovyj, V. Singh, C. S. Theegala, and C. S. S. R. Kumar, Investigation of the synthesis and characterization of platinum-DMSA nanoparticles using millifluidic chip reactor, **Chem. Eng. J.** 2015, 281, 81-86.
24. C. V. Navin, **K. S. Krishna**, C. S. Theegala and C. S. S. R. Kumar, Space and time-resolved probing of heterogeneous catalysis using lab-on-a-chip, **Nanoscale** 2016, 8, 5546-5551.

(d) X-ray Absorption Spectroscopy for Antibacterial Studies:

25. G. L. Bovenkamp, U. Zenzen, **K. S. Krishna**, J. Hormes, and A. Prange, X-ray absorption near edge structure (XANES) spectroscopy study of the interaction of silver ions with Staphylococcus aureus, Listeria monocytogenes and Escherichia coli, **Appl. Environ. Microbiol.** 2013, 79, 6385-6390.
26. U. Zenzen, G. L. Bovenkamp, **K. S. Krishna**, J. Hormes, and A. Prange, Antibacterial action of copper ions on food-contaminating bacteria, **Acta Biol. Szeged.** 2013, 57, 149-151.

(e) To be Published:

1. **K. S. Krishna**, J. Zhang, E. Castro, R. Bernal, X. Li, One-step rapid synthesis of atomically-precise Au₂₅(SG)₁₈ nanoclusters for application in photothermal therapy (Manuscript Submitted).

2. **K. S. Krishna**, E. Castro, L. Echegoyen, X. Li, Enhanced catalytic performance of porous gold nanosponge for oxidation of 5-hydroxymethyl furfural through photothermal effect (Manuscript under preparation)
 3. **K. S. Krishna**, R. Vellacheri and Y. Lei, Electrocatalytic oxidation of 5-hydroxymethyl furfural and formic acid using highly porous palladium nanosponge (Manuscript under preparation).
 4. R. Vellacheri, K. M. Wong, A. Al-Haddad, **K. S. Krishna**, M. Zhou, Q. Fun, M. Wu and Y. Lei, Fast and efficient energy storage at low temperature by MnO₂-based supercapacitor with aqueous electrolyte (Under revision in J. Power Sources).
 5. A. R. Arzola, K. K. Gorlamari, A. J. Metta, **K. S. Krishna**, J. C. Noveron Toroidal-shaped copper (II) coordination polymers with DNA transport properties (Manuscript Submitted).
 6. I. Cruz-Campa, C. Gomez, H. Alarcon, A. Varela, A. Jimenez, **K. S. Krishna**, R. X. Armijos, J. C. Noveron, In vitro and In vivo DNA Transport Properties of Cu(II) and Zn(II) Metallo-Vesicles (Manuscript Submitted).
 7. I. Torres, H. Phan, J. Garcia, N. Dominguez, A. Metta, T. Nguyen, H. Evans, M. J. Resendiz, A. Arif, **K. S. Krishna**, J. C. Noveron, Mesomorphic phases induced by π - π stacking in silver (I) N-(4-pyridyl) benzamide complexes (Manuscript Submitted).
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BOOK CHAPTERS

- **K. S. Krishna**, J. Liu, P. Tarakeshwar, V. Mujica, J. J. Spivey, and C. S. S. R. Kumar, Atomically precise gold catalysis (In Atomically-Precise Methods for Synthesis of Solid Catalysts, Ed., Sophie Hermans and Thierry Visart de Bocarme), Chapter No. 4, RSC Publications, 2015, 87-122.
 - **K. S. Krishna** and M. Eswaramoorthy, Nanorings (In CRC Handbook of Nanophysics: Nanotubes and Nanowires, Ed., Klaus D. Sattler), Chapter No. 39, Taylor & Francis Group Publishers, 2010.
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BOOKS

- N. Tasnim, B. G. Nair, **K. S. Krishna**, S. Kalagara, B. Joddar, M. Narayan and J. C. Noveron, Frontiers in Nano-therapeutics (In Springer Briefs in Nanotheranostics, Ed., T. S. Subramanian), 2017.
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PATENTS

- **K. S. Krishna** and M. Eswaramoorthy, Template free and polymer free metal nanosponge and a process thereof. US patent (8,404,280), PCT (WO 2009/138998 A2), Indian patent (01105/CHE/2008).
 - C. V. Navin, **K. S. Krishna** and C. S. S. R. Kumar, Continuous flow oxidation of 5-Hydroxymethyl furfural to 2, 5-Furandicarboxylic acid at ambient conditions, (US patent applied), 2015.
 - D. K. Singh, **K. S. Krishna**, M. Eswaramoorthy, Teflon assisted ultrafast removal of silica to obtain exceptionally high surface area ordered porous carbon for CO₂ capture (US patent applied), 2016.
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CONFERENCE PRESENTATIONS/POSTERS

- 8th International conference on Nanostructured Materials (Nano-2006), organized by IISc, Bangalore, India, Aug 20-25, 2006.
 - International Conference on Oxide Materials (Oxides -2006), organized by IISc, Bangalore, India, Jan 14-17, 2006.
 - Workshop on ‘Science and Applications of Nanostructured Materials’, Prashanthi Nilayam, India, Nov 29-Dec 1, 2006.
 - Workshop on ‘Science and Applications of Nanostructured Materials’, Prashanthi Nilayam, India, Nov 29-Dec 1, 2006.
 - Winter School on Chemistry of Materials (Dec-2006) organized by JNCASR and International Centre for Materials Research (ICMR).
 - Winter School on Chemistry and Physics of Materials (Dec-2007) organized by International Centre for Materials Research (ICMR) and International Centre for Materials Science (ICMS), JNCASR.
 - Winter School on New Carbon Materials and Functional Oxides (Dec-2008) organized by International Centre for Materials Research (ICMR) and International Centre for Materials Science (ICMS), JNCASR.
 - Winter School on Chemistry and Physics of Materials (Dec-2009) organized by International Centre for Materials Science (ICMS) at JNCASR and Cambridge University, UK and supported by Unilever, Bangalore.
 - International Conference on Nanostructured Materials’ organized by International Centre for Materials Research (ICMR) at International Centre for Theoretical Physics (ICTP), Triesty, Italy, Jan 15-20, 2007.
 - 3rd JNC Research Conference on Chemistry of Materials organized by JNCASR, Munnar, Kerala, India, Sep 28-Oct 1, 2007.
 - 10th International Conference on Advanced Materials (ICAM), Bangalore, India, Oct 8-13, 2007.
 - 4th JNC Research Conference on Chemistry of Materials organized by JNCASR, Alleppy, Kerala, India, Sep 27-29, 2008.
 - International Conference on ‘Molecules and Materials: New Directions’ organized by International Centre for Materials Science (ICMS) at JNCASR, Bangalore, India, Dec 04-06, 2008.
 - National Conference on Functional Materials, organized by Indian Institute of Bombay at Goa, India, Aug 14-16, 2009.
 - Indo-US conference on ‘Advanced Materials Research’ organized jointly by International Centre for Materials Science (ICMS) and Indo-US Science and Technology Forum, JNCASR, India, Sep 1-2, 2009.
 - International school and conference on ‘Emergent properties and novel behavior at the nanoscale’ organized jointly by I2CAM, US Army, US Airforce, ICMS, JNCASR, India, April 19-27, 2010.
 - ‘Atomically precise nanocluster catalysts’ at 242nd ACS National Meeting, Aug 28 - Sep 1, 2011, Denver, Colorado, USA.
 - ‘Gold catalysts immobilized within millifluidic chip reactor’ at 245th ACS National Meeting, Apr 7 – 11, 2013, New Orleans, USA.
 - BMBF ZIK project ‘3DNanoDevice’ conference held in the IMN MacroNano (ZIK) at TU Ilmenau, Germany, Nov 2014.
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