AJITH PATTAMMATTEL, PhD

RESEARCH ASSOCIATE AT BROOKHAVEN NATIONAL LABORATORY, UPTON,NY

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HIGHLIGHTS

- Experience in the x-ray techniques such as absorption spectroscopy, diffraction, tomography, fluorescence, phase contrast imaging etc.
- Knowledge of materials science principles, theories, advanced characterization techniques, and practices for the design, analysis, and characterization of 2D nanomaterials, biocomposites, and energy storage materials
- Experience in machine/deep learning, and scientific computing using Python and MatLab
- Published 20 peer-reviewed articles and One Full Book

EDUCATION

University of Connecticut   Storrs, CT (2011–2016)
- Doctor of Philosophy (Ph.D.), Chemistry
- Thesis: Bioengineering of Two-Dimensional Nanomaterials via Green and Sustainable Routes

Cochin Univ. of Science and Technology   Cochin, India (2008–2010)
- Master of Chemistry (MSc)
- University First Rank

Mahatma Gandhi University   Kottayam, India (2005–2008)
- Bachelor of Chemistry (BSc)

WORK EXPERIENCE

Brookhaven National Laboratory

Research Associate   Upton, NY (June 2018-Present)
- Led and coordinated the development of a new X-ray spectroscopy technique (nano-XANES) at the Hard X-ray Nanoprobe beamline in NSLS-II
- Utilized the newly developed spectroscopy technique for characterization of Li-ion Battery cathode materials
- Implemented a python-based in-line workflow for the spectroscopy and image data
- Developed supervised and unsupervised cluster analysis methodology for spectro-microscopy data
- Contributed and supported research activities of national and international scientists in a multidisciplinary team environment.

University of California-Merced

Postdoctoral Associate   Merced,CA (Aug 2016-June 2018)
- Implemented combined Electron microscopy and Synchrotron spectroscopic and microscopic techniques for chemical speciation of nanoscale particulate matter.
- Designed and synthesized synthetic analogues of particulate matter

University of Connecticut

Graduate Research and Teaching Assistant   Storrs,CT (August 2011- July 2016)
- Designed and developed a method for protein-assisted, gram-scale production of 2D nanomaterials
- Characterization of nanomaterials using Electron Microscopy, Raman Spectroscopy, and Zeta Potential measurements
- Led, scheduled and coordinated laboratory activities of teams working on thermally stable enzymes
- Trained and mentored graduate and undergraduate students on synthesis and characterization of nanomaterials; provided technical support in their projects

TEACHING AND MENTORING

- Research Mentor at UConn and UC-Merced:10 undergraduates, 2 graduate students and one high school student

- Graduate Teaching Assistant at UConn, Physical Chemistry (senior level), Organic (Junior) and General Chemistry (Freshmen) theory and laboratory courses

HONORS AND AWARDS

- Endowment Award for the Highest GPA in MSc in Chemistry 2010, Cochin Univ. of Science and Technology
- Qualified for Indian Junior Research Fellowship in Chemistry, CSIR-2011 (National Rank 203, Top 0.3%)
- Award for the best Green Idea in the Campus in 2012, CCEI, UConn, 2012

SERVICES

- Reviewer for JMC.B, ACS Applied Mater. Interfaces, Methods in Enzymol, Applied Sciences, Ceramics, J. Carbon Res., Processes and Molecules
- External Reviewer for user proposals at Stanford Synchrotron Radiation Lightsource (SSRL)
- Judge for American Chemical Society Meeting, Environmental Division, New Orleans, 2018
- President of the Indian Graduate Student Association, UConn, 2013 & 2014

PUBLICATIONS

1. **Pattammattel, A.**, Leppert, V., Aronstein. P., Robinson, M., Mousavi, A., Sioutas, C., Forman, H. J., O'Day, P. A., Iron Speciation in Particulate Matter (PM2.5) from Urban Los Angeles Using Spectro-microscopy Methods, Atmospheric Environment, **2020**. in press (IF-4.0)

2. **Pattammattel, A.**, Tappero R., Ge, M., Chu, Y. S., Huang, X., Gao, Y., and Yan, H., High-sensitivity Nanoscale Chemical Imaging with Hard X-ray Nano-XANES, Sci. Adv.,**2020**,6, eabb3615. (IF-13.1)

3. Chu Y. S., Lee, W. K.,Tappero, R., Ge, M., Huang, X., Xiao, X., Yan, H., Northrup, P., Thieme, J., Kiss, A. M., Williams, G., Yang, Y., Nicholas, S. L., **Pattammattel**, A., Smith, S., Ilinski, P., and Du, Y.,Chu, Yong S., et al. Multimodal, Multidimensional, and Multiscale X-ray Imaging at the National Synchrotron Light Source II. Synchrotron Radiation News **2020**,33, 29. (IF-0.7)

4. Xu,W., Xu,W., Bouet, N., Zhou, J., Yan, H., Huang, X., **Pattammattel, A.**, Gao, Y., Lu, M., Zalalutdinov, M., Chu, Y. S., and Nazaretski, E., 2D MEMS-based multilayer Laue lens nanofocusing optics for high-resolution hard x-ray microscopy, Optics Express, **2020**, 28, 17660. (IF-3.7)

5. Li, K., Ali, S., Wojcik, M., Andrade, V.D., Huang, X., Yan, H., Chu,Y., Nazaretski E., **Pattammattel, A.**, and Jacobsen, C., Tunable hard x-ray nanofocusing with Fresnel zone plates fabricated using deep etching, Optica **2020**, 7, 410. (IF-7.2)

6. **Pattammattel, A.**,* Leppert, VL, Forman, H. J., O'Day, P. A.,* Surface Characterization and Chemical Speciation of Adsorbed Iron(III) on Oxidized Carbon Nanoparticles, Environ. Sci.: Processes Impacts, **2019**, 21, 548 (**co-corresponding author**). (IF-2.7)

7. **Pattammattel, A.**, Stromer, B. S., Baveghems, C., Benson, K.; Kumar, C. V., Stimuli-responsive, ,protein hydrogels for potential applications in enzymology and drug delivery, J. Chem. Sci. **2018**, 130, 145. (IF-1.5)

8. **Pattammattel, A.**, Pande, P., Kuttappan, D., Basu, A.B., Amalaradjou, A., Kumar, C. V., Controlling Graphene-Bio Interface: Dispersions in Animal Sera for Enhanced Stability and Reduced Toxicity, Langmuir **2017**, 33, 14184. (IF-3.6)

9. Baveghems, C., Anuganti M., **Pattammattel, A.**, Lin, Y., Kumar C.V., Tuning Enzyme/alpha-Zr(IV)Phosphate Nanoplate Interactions via Chemical Modification of Glucose Oxidase. Langmuir **2017**, 34, 480. (IF-3.6)

10. Ghimire, A., **Pattammattel, A.**, Kasi, R., Kumar C.V., 3-Dimensional, Enzyme Biohydrogel Electrode for Improved Bioelectrocatalysis, ACS Appl. Mater. Interfaces **2017**, 9, 42556. (IF-8.4)

11. Benson, K., Ghimire, A., **Pattammattel, A.**, and Kumar, C.V., Protein BioPhosphors: Biodegradable, Multifunctional, Protein-based Hydrogels for White Emission, Sensing, and pH detection. Adv. Funct. Mater. **2017**, 27, 1702955. (IF-15.6)

12. Mosa, I., **Pattammattel, A.**, Kadimisetty, K., El-Kady, M. F., Pande, P., Bishop, G. W., Novak, M. J., Basu, A. K., Kaner, R. B., Kumar, C. V., Rusling, J. F., Ultrathin graphene-protein supercapacitors for implantable biomedical devices, Adv. Energ. Mater. **2017**, 7, 1700358. (**Highlighted in 30 national and international news outlets/blogs including Fox, Yahoo, Readers Digest, Nature Middle East and UCLA news**) (IF-24.9)

13. Baveghems, C., **Pattammattel, A.**, Kumar C.V., Designer Histone Complexes: Controlling Protein- DNA Interactions with Protein Charge as 'All-Or-None' Digital Switch, J. Phys. Chem. B. **2016**, 120, 11880. (IF-2.9)

14. **Pattammattel, A.**, and Kumar, C.V., Kitchen Chemistry 101: Multi-gram production of high quality bi-ographene in a blender with edible proteins, Adv. Funct. Mater. **2015**, 25, 7088. (IF-15.6)

15. **Pattammattel, A.**, Williams, C. L., Pande, P., Tsui, W. G., Basu, A. K., Kumar, C.V., Biological relevance of oxidative debris present in as-prepared graphene oxide. RSC Advances **2015**, 5, 59364. (IF-3.0)

16. Novak, M. J., **Pattammattel, A.**, Koshmerl, B., Puglia, M., Williams, C.L., Kumar, C.V., 'Stable-on-the-Table' Enzymes: Engineering Enzyme Charge to Enhance Enzyme-Graphene Oxide Interactions with Unprecedented, Kinetic Stability, ACS Catalysis **2015**. 1, 339. (IF-12.2)

17. Zore, O. V., **Pattammattel, A.**, Gnanaguru, S., Kumar, C. V., Kasi, R. M., BienzymePolymerGraphene Oxide Quaternary Hybrid Biocatalysts: Efficient Substrate Channeling under Chemically and Thermally Denaturing Conditions. ACS Catalysis **2015**, 5, 4979. (IF-12.2)

18. Deshapriya, I. K., Stromer, B. S., **Pattammattel, A.**, Kim, C. S., Bartolome, R. I., Fajardo, L. G., Patel, V., Gutkind, J. S., Lu, X., Kumar, C. V., Fluorescent, Bioactive Protein Nanoparticles (Prodots) for Rapid, Improved Cellular Uptake. Bioconj. Chem. **2015**, 26, 396. (**Cover article**) (IF-4.3)

19. **Pattammattel, A.**, Puglia, M., Chakraborty, S., Deshapriya, I. K., Dutta, P. K., Kumar, C.V., Tuning the Activities and Structures of Enzymes Bound to Graphene Oxide with a Protein Glue. Langmuir **2013**, 29, 15643.(IF-3.6)

20. **Pattammattel, A.**, Deshapriya, I. K., Chowdhury, R., Kumar, C. V., Metal-Enzyme Frameworks: Role of Metal Ions in Promoting Enzyme Self-Assembly on alpha-Zirconium(IV) Phosphate Nanoplates. Langmuir **2013**, 29, 2971 (IF-3.6)

BOOK CHAPTER

Kumar, C. V., Pattammattel, A., BioGraphene: Direct exfoliation of graphite in a kitchen blender for enzymology applications, Methods Enzymol. 2016.Volume 571,Pages 225-244

BOOK

Kumar, C. V., Pattammattel, A., Introduction to Graphene: Chemical and Biochemical Applications. Elsevier Science: 2017, ISBN: 0128132701, 9780128132708 (232 pages).

PATENT

Rusling, J. F., Mosa, I. M., Kumar, C. V., Pattammattel, A. U.S. Patent Application No. 16/035,351 (Pending)

ORAL PRESENTATIONS

1. (**Invited**) Goldschmidt 2020 Title: Nano-XANES: Chemical Mapping with Hard X-Rays., https://doi.org/10.46427/gold2020

2. (**Invited**) National Synchrotron Light Source-II, Photon Sciences Monthly Seminar October 2019, Title: High-Sensitivity Chemical Imaging with 50 nm Resolution by Hard X-ray nano-XANES at HXN

3. Brookhaven National laboratory - Early Career Research Symposium 2019, Title : Nanoscale Chemical Imaging with Hard X-rays

4. The American Chemical Society Meeting, Spring 2018. Title: Surface oxidation and iron speciation on carbon nanoparticles for precise air pollution models

5. The American Chemical Society Meeting, Spring 2017, San Francisco. Title: Synthetic nanoparticle analogues for studying biological response to airborne particulate matter

6. The American Chemical Society Meeting, San Diego,Spring 2016. Title: Edible chemistry 101: Direct exfoliation of graphite to graphene in serum