

Athira S Vijayan

Contact

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Skills

Electrochemical techniques

- Corrosion/Bio-corrosion
- Electrochemical impedance spectroscopy (EIS)
- Potentiodynamic polarization
- Electrodeposition
- Anodization
- Cyclic voltammetry (CV)
- Chronoamperometry

Synthesis

- Wet chemistry
- Coatings / thin films
- Nano material synthesis
- Polymer nanocomposites
- Alloying / Ball milling
- Spin coating
- CVD

Characterization

- Raman spectroscopy (Horiba)
- XRD (Malvern PANalytical)
- SEM (Zeiss Sigma 300)
- DLS (Malvern Zetasizer)
- UV-Vis (Shimadzu-1800)
- TEM
- XPS
- TGA
- FT-IR

Additive manufacturing

- Fused deposition modelling

Other technical skills

- Bacterial cell culture & Animal cell culture
- Mechanical testing (UTM)
- 3D Bioprinting
- Electrospinning

Experience

Technical consultant

Nov 2024 - Present

Neiox Eco-cycle Pvt.Ltd., Kerala, india

- Engineered innovative anti-biofouling coatings using industrial waste, resulting in high bio-corrosion inhibition efficiency and anti-bacterial properties for industrial and marine coatings.
- Orchestrated a research proposal focusing on a sustainable technology for the conversion of industrial pollutants to anti-biofouling/anti-corrosive coatings, successfully securing a recent funding of approximately Rs. 1 crore from Cochin shipyard, India.
- Initialized the project by recovering the industrial pollutant characterizing it to understand its material properties.
- The antibacterial efficiency of the recovered pollutant has been checked and found satisfactory. Development of an anti-fouling coating based on the pollutant has been started.

Doctoral Research Fellow

Dec 2020 - Present

National Institute of Technology Calicut, India

- Investigated the enhanced anti-biofouling property of water-borne epoxy coating by the incorporation of PDA- functionalized ceria-zirconia nanoparticles.
- Developed environment-friendly and cost - effective MoS₂ nanosheets decorated with Ag-TiO₂ with effective antifouling capacity and incorporated it to polyurethane based marine coating.
- Designing and implementing a sustainable technology for the conversion of industrial pollutants to anti-biofouling/anti-corrosive coatings. (*ongoing*)
- Investigating the applicability of MoS₂ nanosheets decorated with Ag-TiO₂ based nano-fibers as air filter with superior ant-biofouling property. (*Ongoing*)

Guest Lecturer

Oct 2016 – Oct 2017

St. Thomas College, Kerala, India & Adoor Polytechnic College, Kerala, India

- Delivered lectures on chemistry to undergraduate students covering fundamental and advanced topics.
- Engaged students through interactive discussions and practical applications to enhance their understanding.

Education

PhD in Materials Science and Engineering

Dec 2020 - Present

National Institute of Technology Calicut, India

Thesis: Development of nanomaterials-based coatings for anti-biofouling applications.

Master of Technology in Nano Science and Technology (with First Rank)

July 2018 – May

2020 Madras University, Tamil Nadu, India

Master of Science in Chemistry

July 2013 – April 2015

Madras Christian College, Tamil Nadu, India

Bachelor of Science in Chemistry

July 2010 – April 2013

St. Thomas College, Kerala, India

Qualified NET (National Eligibility Test) in Chemistry – 2016, Conducted by UGC/CSIR

Organizational Experience

- Currently leading a team of 2 junior research fellows to provide technical guidelines to Neiox Eco-cycle pvt.ltd. for developing a sustainable technology to convert industrial pollutant to anti-fouling marine coatings.
- Mentored 2 master's and bachelor's students for dissertations and internships, and currently guiding 2 students offering support on research design, data analysis, and publication strategies.
- Headed the publication committee and successfully organized the International Conference on Materials for Energy, Environment, and Healthcare (MEEHCON'24) conducted by the Department of Materials Science and Engineering, NIT Calicut.
- Served as a Department councilor in the student's affairs council, NIT Calicut for the academic year 2022-2023.
- Won the 'Best Poster Award' at MEEHCON' 24 - International Conference on Materials for Energy, Environment, and Healthcare, sponsored by ACS Applied nano materials, ACS publications.

Patent and Selected Publications

▪ Patent

A biocompatible anticorrosive/anti-biofouling additive from industrial pollutants by hexagonal Boron Nitride incorporation, Athira S Vijayan, Sajith V, Baiju G Nair, Akhil Raj. **(Submitted)**

▪ Publications

- Gopinath, N., Karthikeyan, A., Joseph, A., **Vijayan, A. S.**, et.al. Fluorescent carbon dot embedded polystyrene: an alternative for micro/nanoplastic translocation study in leguminous plants. *Environ Sci Pollut Res* **31**, 49317–49329 (2024). <https://doi.org/10.1007/s11356-024-34464-7>
- **Vijayan, Athira S.**, Joseph, Abey., Nair, Baiju., G Vandana, Sajith., MoS₂/Ag-TiO₂/Polyurethane Nanocomposite as a Photocatalytic Coating for Antibiofouling Applications. *ACS Applied Nano Materials* **7** (16) 19024 – 19042 (2024) <https://pubs.acs.org/doi/full/10.1021/acsanm.4c02937>
- **Vijayan, A. S.**, Joseph, A., Joseph, A., Abhijith, T S., Nair, B. G., & Sajith, V. Polydopamine functionalised ceria-zirconia nanoparticles embedded water-borne epoxy nanocomposite for anti-biofouling coatings. *Progress in Organic Coatings*, **187**, 108094. (2024). <https://doi.org/10.1016/j.porgcoat.2023.108094>
- Joseph, A., **Vijayan, A. S.**, Shebeeb, M., Akshay, K. S., John Mathew, K. P., & Sajith, V. A Review on Tailoring the Corrosion Properties of MoS₂ based Coatings. *Journal of Materials Chemistry A*. **11**, 3172-3209 (2023). <https://doi.org/10.1039/D2TA07821J>.
- Joseph, A., Muhammad L., F., **S Vijayan, A.**, Xavier, J., K.B., M., Karthikeyan, A., Gopinath, N., P.V., M., & Nair, B. G. 3D printed arrowroot starch-gellan scaffolds for wound healing applications. *International Journal of Biological Macromolecules*, **264**, 130604. (2024). <https://doi.org/10.1016/j.ijbiomac.2024.130604>
- S. Ganesh Babu¹, **Athira S. Vijayan**², B. Neppolian^{*1}, and M. Ashokkumar³, SnS₂/rGO: An Efficient Photocatalyst for the Complete Degradation of Organic Contaminants. *Materials Focus* **4**(4):272-276, 2015. <https://doi.org/10.1166/mat.2015.1247>
- Arathi Chandran; **Athira S Vijayan**; R Vishnu; Kanica Upadhyay; V.C Prahlad; Ashok Kumar; I.B Maurya; Anju S Vijayan, *International Journal of Biological Macromolecules (Under review)*
- Ayisha Nahala PT, Fathima Nishana, Smitha KV, **Athira S Vijayan**, Servin P Wesley, Abdul Irshad Mangettukara, Deepa K, *Journal of microbiology, biotechnology and food sciences (Under review)*
- Wan Adibah Wan Mahari; Sabiqah Tuan Anuar; Kesaven Bhupalan; Yusof Shuaib Ibrahim; Su Shiung Lam; **Athira S Vijayan**; Antony Joseph; Sajith Vandana; Kandiyl K Juraij; KL Priya; Jose Hernandez Santos; Mr Govinda; Chingakham Chinglenthoba, *Environmental Chemistry Letters (Under review)*