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Notice for the PhD Viva Voce Examination

Mr Jephin K Jose (Registration Number: 1942084), PhD scholar at the School of Sciences, CHRIST (Deemed to be University), Bangalore will defend his PhD thesis at the public viva-voce examination on Thursday, 9 May 2024 at 10.00 am in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru - 560029.

Title of the Thesis	:	**Synergetic Effect of Metal Nanoparticle Embedded Graphene Membrane: A Novel Approach for Antimicrobial Filtration**
Discipline	:	**Physics**
External Examiner (Outside Karnataka)	:	**Dr Krishna Moorthi Chintagumpala** Associate Professor Department of Applied Physics Centre for Nanotechnology Research Vellore Institute of Technology Vellore – 632014 Tamil Nadu
Tamil Nadu		
External Examiner (Within Karnataka)	:	**Dr Neena Susan John** Scientist Centre for Nano and Soft Mater Science Arkavathi Campus, Survey No.7 Shivanapura Bengaluru – 562162 Karnataka
Supervisor	:	**Dr Manoj B** Professor Department of Physics and Electronics School of Sciences CHRIST (Deemed to be University) Bengaluru - 560029 Karnataka

The members of the Research Advisory Committee of the Scholar, the faculty members of the Department and the School, interested experts and research scholars of all the branches of research are cordially invited to attend this open viva-voce examination.

Registrar

Place: Bengaluru
Date: 03 May 2024

ABSTRACT

Water, the elixir of life, holds a profound significance that extends far beyond its essential utility. However, the adequacy of portable water quality confronts adverse impacts stemming from inadequate wastewater treatment, escalating domestic and industrial waste, and the microbial contamination of surface water sources. Advanced technologies for the purification of contaminated water encompass sedimentation, precipitation, filtration, and ion exchange, which can effectively extract clean water from diverse impurities. Notably, membrane-based purification has gained prominence in recent years, owing to its cost-effectiveness and energy-saving attributes. It is noteworthy to highlight that reduced graphene oxide (rGO) exhibits less antibacterial properties compared to graphene oxide (GO).

The disinfection capability of the membrane is pivotal in ensuring the recovery of pure water. To bolster the antibacterial features of GO, we have undertaken an enhancement strategy by incorporating silver nanoparticles. Despite the antifouling properties exhibited by GO-Ag membranes, there exists further improvement in enhancing performance and extending the membrane's lifespan. To address this, we have undertaken a reduction of graphene oxide and incorporated silver nanoparticles, aiming to augment the antifouling properties and overall efficacy of the membrane.

Keywords: Graphene oxide, reduced graphene oxide, membrane filtration, surface plasmon resonance, antibacterial, antifouling, silver nanoparticles

Publications:

1. **Jephin K Jose**, Biswajit Mishra, Christie Thomas Cherian, Bijay P. Tripathi, and Manoj Balachandran. "Synthesis and characterization of graphene oxide and reduced graphene oxide membranes for water purification applications." Emergent Materials (2023): 1-6.
2. **Jephin K Jose**, Biswajit Mishra, Kavya Parambath Kootery, Christie Thomas Cherian, Bijay P. Tripathi, Suma Sarojini, and Manoj Balachandran. "Fabrication of silver nanoparticle decorated graphene oxide membranes for water purification, antifouling and antibacterial applications." Materials Science and Engineering: B 297 (2023): 116789.
3. **Jephin K Jose**, Christie T. Cherian, and Manoj Balachandran. "A Review on Advanced Nanomaterials for Antibacterial Applications." Current Nanoscience 19, no. 6 (2023): 803-816.
4. **Jephin K Jose**, Christie Thomas Cherian, M Balachandran, B Mishra, BP Tripathi "Fabrication of Silver Embedded Reduced Graphene Oxide - Polyethersulfone Membrane with Antibacterial, Antifouling and Catalytic Properties for Water Purification", IN Patent App. 202341039520 A