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Notice for the PhD Viva Voce Examination

Mr Rijo Rajeev (Registration Number: 2170240), 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 Tuesday, 19 November 2024 at 10.30 am in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru - 560029.

Title of the Thesis	:	**Nanomaterial-Based Electrochemical Sensor for Monitoring the Potential Biomarkers of Chronic Disorders**
Discipline	:	**Chemistry**
External Examiner (Outside Karnataka)	:	**Dr Prem Felix Siril** Associate Professor School of Chemical Sciences Indian Institute of Technology, Mandi Kamand, Himachal Pradesh
External Examiner (Within Karnataka)	:	**Dr K V Gobi** Professor Department of Chemistry National Institute of Technology Warangal, Hanamkonda Telangana
Supervisor	:	**Dr Anitha Varghese** Professor Department of Chemistry 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: 15 November 2024

ABSTRACT

Detecting various biomarkers in the health industry and the biomedical sector has been significant due to their crucial role in diagnosing, assessing, exposing, and treating disorders. This work reports electrochemical sensors for detecting biomarkers using different modifications (2D materials and nanomaterials) on carbon fiber paper-based (CFP) sensors. Adopting these modifications on the CFP electrode greatly intensified the oxidation and reduction of peak current values. The physio-chemical characterizations of the designed electrodes were examined employing Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Electron Diffraction X-ray (EDX), X-Ray Photoelectron spectroscopy (XPS), Fourier Transform Infrared Spectroscopy (FTIR), and Raman Spectroscopy.

Cyclic voltammetry (CV) and differential pulse voltammetry (DPV) assisted in optimizing the electrochemical properties via Nyquist plots, sensing performance, scan rate effect, and pH effect. Both electro-activity studies and Nyquist plots confirmed the enhancement in the electroanalytical performance of the fabricated electrodes. Real sample studies were successfully analyzed using developed electrodes, producing good recovery percentages. Overall, all the works conducted have been established to be facile and selective, with novelty in the fabrication of ultrasensitive voltammetric-based sensors to quantify different biomarkers.

Keywords: Carbon fiber paper electrode, Biomarkers, Electrochemical sensors, Nanomaterials, Chronic disorders

Publications:

1. **Rijo Rajeev**, Anila Rose Cherian, Ditto Abraham Thadathil, Anitha Varghese (2024). Electrochemical determination of Vitamin B6 using coral-like MnO2-Pi on Ti3C2Tx MXene. Materials Research Bulletin, 169, 112523 https://doi.org/10.1016/j.materresbull.2023.112523.
2. **Rijo Rajeev**, Sk Safikul Islam, Anitha Varghese, Gurumurthy Hegde, Suryasarathi Bose (2024). Hierarchical porous covalent organic framework-based sensor for the detection of neurodegenerative disorder biomarkers. Materials Chemistry and Physics, 312, 128615 https://doi.org/10.1016/j.matchemphys.2023.128615.
3. **Rijo Rajeev** and Anitha Varghese (2024). High-Performance β-cyclodextrin-Ti3C2Tx MXene-Based Electrochemical Sensor for the Detection of Neurological Disorder Biomarker. Journal of The Electrochemical Society, 171(2), 027504 10.1149/1945- 7111/ad2316.