Notice for the PhD Viva Voce Examination

Ms Agnus T Mathew (Reg. No. 1881402), PhD scholar at the School of Sciences, CHRIST (Deemed to be University), will defend her PhD thesis at the public viva-voce examination on Thursday, 27 January 2022 at 11.00 am on the WebEx Meeting platform.

Title of the Thesis	:	**Modified Carbon Substrates for Electrocatalytic Oxidation of Selected Heterocyclic Carbinols**
Discipline	:	**Chemistry**
External Examiner (Outside Karnataka)	:	**Dr Joby Thomas K** Professor Department of Chemistry St Thomas College (Autonomous) Keerankulangara, Thrissur Kerala - 680001
External Examiner (Within Karnataka)	:	**Dr Ronald J Mascarenhas** Professor Department of Chemistry St Joseph's College Autonomous Bengaluru Karnataka
Supervisor	:	**Dr Anitha Varghese** Professor Department of Chemistry School of Sciences CHRIST (Deemed to be University) Bengaluru -560029

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.

Registrar

Place: Bengaluru
Date: 20 January 2022

ABSTRACT

Electrochemically modified carbon electrodes are used as a substrate for electrocatalytic oxidation of different heterocyclic carbinols. Carbon fiber paper (CFP) is used as the electrode substrate on which various modifications are employed. Modified electrodes were prepared by using different surface modification strategies such as electrodeposition of Pd nanoparticles or Pd-Pt bimetallic nanoparticles on a conducting polymer, polyaniline which is electropolymerized on to CFP. Biomass derived porous carbon nanoparticle coated CFP was also used for electrodeposition of Pd nanoparticles or MnO2-Pi nanoparticles. These modified electrodes were physicochemically characterized by X-ray diffraction (XRD), Field emission scanning electron microscopy (FESEM) with energy-dispersive X-ray spectroscopy (EDS), Transmission electron microscopy (TEM), Raman spectroscopy, Fourier transform infrared (FTIR) spectroscopy, Optical profilometry and X-ray photoelectron spectroscopy (XPS) and electrochemically characterized using Cyclic voltammetry (CV) and Electrochemical impedance spectroscopy (EIS). These modification methods have attracted a lot of attention due to their exceptional stability, high electronic conductivity, mechanical strength, and good adhesive property to the substrate and to the modified electrode. The modified electrodes show excellent electrochemical and physicochemical properties which are demonstrated using various analytical techniques.

The organocatalytic reagent, TEMPO is used as a mediator throughout the studies which helps to carry out the oxidation of organic molecules in an aqueous acidic medium. The developed electrodes have been successfully applied for the oxidation of different heterocyclic alcohol such as 4-pyridinemethanol, 2-thiophene methanol, and 2-Furfuryl alcohol to corresponding 4-pyridinemethanal, 2-thiophene methanol and 2-Furfural.

Keywords: Electrocatalytic oxidation, electrical conductivity, TEMPO, Heterocyclic carbinol, porous carbon, Electrode modifiers, Conducting Polymers, Carbon Nanospheres, Carbon Fiber Paper.