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Notice for the PhD Viva-Voce Examination

Ms Sruthi Rajasekaran (Registration Number: 1981402), PhD scholar at the School of Sciences, CHRIST (Deemed to be University), Bangalore will defend her PhD thesis at the public viva-voce examination on Wednesday, 11 October 2023 at 10.30 am in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru - 560029.

Title of the Thesis	:	**Modified Metal Organic Frameworks for Electrocatalytic Water Splitting and Energy Storage Applications**
Discipline	:	**Chemistry**
External Examiner (Outside Karnataka)	:	**Dr Sreekumar Kurungot** Senior Principal Scientist Physical & Materials Laboratory CSIR National Chemical Laboratory (NCL) Pune, Maharashtra
External Examiner (Within Karnataka)	:	**Dr H S S Ramakrishna Matte** Scientist D Centre for Nano and Soft Matter Sciences (CeNS) Department of Science and Technology, Govt of India Survey No.7, Shivanapura, Dasanapura Hobli, Bengaluru – 562162 Karnataka
Supervisor	:	**Dr Sunaja Devi K R** 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: 05 October 2023

ABSTRACT

Metal-organic frameworks (MOFs) are a class of crystalline material formed by the combination of metal ions/clusters along with organic linkers. This work is mainly based on synthesizing MOFs and their application in electrocatalytic water splitting and supercapacitors. The MOFs synthesized in the present work are Ni-Cu, {Mn-Ni-NH_2($h_2$fipbb)}, Mn-MOF/rGO, and Sm-MOF/rGO/PANI using different ditopic and tritopic linkers. Using various characterization techniques, the formation of the synthesized MOFs is confirmed. The increasing use of fossil fuels now contributes to a number of environmental problems, including climate change and global warming. High-performance electrochemical energy storage devices are essential for portable electronics, electric cars, and renewable energy storage medium, driving demand. MOFs are emerged as a promising contender for energy storage applications owing to their novel microstructures, atomically dispersed metal centers, and earth-abundant metal components.

Electrochemical water splitting is a crucial approach in the pursuit of producing environmentally friendly fuels such as H_2 and O_2, reducing our dependence on traditional fossil fuels while promoting sustainable and clean energy sources. In order to produce hydrogen with the best efficiency and lowest cost, these MOFs are used. Electrochemical studies like cyclic voltammetry, galvanostatic charge discharge, and electrochemical impedance spectroscopy reveal that the prepared MOFs can be used as supercapacitors. Linear sweep voltammetry, and Tafel plot determines the performance of these MOFs towards water splitting studies. Supercapacitors, which are electrochemical capacitors, are popular energy storage device with quick charge rate, high power density, excellent rate capability, and outstanding life expectancy.

***Keywords**: Metal organic framework; Electrocatalytic water splitting; Supercapacitors; ditopic; tritopic linkers*

Publications:

1. **Sruthi Rajasekaran**, B. Shalini Reghunath, Sunaja Devi K. R*, B. Saravanakumar, J. Johnson William, Dephan Pinheiro, Madan Kumar Arumugam, Facile synthesis of Mn-Ni bimetal organic framework decorated with amine as an electrode for a high-performance supercapacitor, 2023, Journal of Solid-State Electrochemistry, https://doi.org/10.1007/s10008-023-05382-4.
2. **Sruthi Rajasekaran**, B. Shalini Reghunath, Sunaja Devi K. R*, B. Saravanakumar, J. Johnson William, Dephan Pinheiro, Bi Functional Manganese-Pyridine 2,6 Dicarboxylic Acid Metal Organic Frameworks with Reduced Graphene Oxide as an Electroactive Material for Energy Storage and Water Splitting Applications, 2023, Journal of Electrochemical Society, DOI: 10.1149/1945-7111/acbfe3
3. **Sruthi Rajasekaran**, B. Shalini Reghunath, Sunaja Devi K. R*, Dephan Pinheiro, Designing coordinatively unsaturated metal sites in bimetallic organic frameworks for oxygen evolution reaction, 2023, Materials Today Chemistry (Accepted)