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Notice for the PhD Viva Voce Examination

Ms Aswathi V P, Registration Number: 2270125, PhD Scholar at the Department of Chemistry, School of Sciences, CHRIST (Deemed to be University) will defend her PhD thesis at the public viva-voce examination on Thursday, 09 April 2026 at 02.00 pm in Room No. 044, Ground Floor, R&D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka, India.

Title of the Thesis	:	**Integration of Graphitic Carbon Nitride and Unzipped Multiwalled Carbon Nanotube with Metal Oxides for Next Generation Energy Storage**
Discipline	:	**Chemistry**
External Examiner - I	:	**Dr Balasubramanian K** Senior Professor Department of Metallurgical and Materials Engineering Defence Institute of Advanced Technology (Deemed to be University), Girinagar Pune - 411025
External Examiner - II	:	**Dr Neena Susan John** Scientist Centre for Nano and Soft Matter Sciences Arkavathi Campus Shivanapura, Dasanapura Hobli Bengaluru - 562162 Karnataka
Supervisor	:	**Dr Sreeja P B** Associate 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 (Academics)

Place: Bengaluru
Date: 23 March 2026

ABSTRACT

This thesis presents a systematic approach to develop high-performance supercapacitor electrodes by functionalizing graphitic carbon nitride (GCN) and unzipped multi-walled carbon nanotubes (UzMWCNTs) with pseudocapacitive materials of NiFe2O4, V2O5, and polyaniline (PANI). Hybrid composites were synthesized through hydrothermal treatment and in-situ polymerisation, effectively coupling electric double-layer capacitance with Faradaic charge storage. Electrochemical studies revealed outstanding specific capacitances of 770 F/g (GCN/NiFe2O4/PANI), 880 F/g (GCN/V2O5/PANI), 1022 F/g (UzMWCNT/NiFe2O4/PANI), and 1135 F/g (UzMWCNT/V2O5). Symmetric devices fabricated from these composites also delivered strong capacitive performance, underscoring their practical viability. Comprehensive structural and physicochemical analyses (XRD, SEM, TEM, Raman, XPS) confirmed the distribution of active phases, while CV, GCD, and EIS validated the enhanced charge storage behaviour. Overall, the study demonstrates that rational integration of carbon frameworks with pseudocapacitive materials can significantly advance sustainable energy storage, bridging the gap between conventional EDLCs and battery-type systems.

Keywords: *Graphitic Carbon Nitride, Unzipped Multiwalled Carbon Nanotubes (UzMWCNT), Metal Oxides, Conducting Polymers, Symmetric Supercapacitor.*

Publications:

1. **V. P. Aswathi**, and P.B. Sreeja, "Synergistic advancements in energy storage: g-C3N4/NiFe2O4/PANI composite with augmented electrochemical capabilities." Electrochimica Acta, vol. 499, p. 144710, Jul. 2024, doi: 10.1016/j.electacta.2024.144710.
2. **V. P. Aswathi** and P. B. Sreeja, "Synergistic g-c3n4/v2o5/pani composite for electrochemical energy storage," Journal of Energy Storage, vol. 107, p. 114993, Dec. 2024, doi: 10.1016/j.est.2024.114993.
3. **V. P. Aswathi** and P. B. Sreeja, "Ternary composite of unzipped multiwalled carbon nanotubes (curved graphenes) for next-generation capatteries," Journal of Colloid and Interface Science, vol. 693, p. 137637, Apr. 2025, doi: 10.1016/j.jcis.2025.137637
4. **V. P. Aswathi**, V. Raman, and P. B. Sreeja, "Defect engineered unzipped multiwalled carbon nanotube/vanadium pentoxide composite for high-performance supercapacitor application," *RSC Advances*, vol. 16, no. 13, pp. 11404–11414, 2026, doi: https://doi.org/10.1039/d6ra00149a.