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Notice for the PhD Viva Voce Examination

Ms Divya T, Registration Number: 1881401, 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 Wednesday, 13 May 2026 at 10.00 am in Room No. 044, Ground Floor, R&D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka, India.

Title of the Thesis	:	**Cellulose-Derived Carbon-Supported Transition Metal Catalysts for Organic Conversions**
Discipline	:	**Chemistry**
External Examiner - I	:	**Dr Rajesh Kumar** Professor Department of Physics Indian Institute of Technology Indore Materials and Device Lab Indore - 453552 Madhya Pradesh
External Examiner - II	:	**Dr Binitha N N** Professor Department of Chemistry University of Calicut Thenhipalam - 673635 Kerala
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

Place: Bengaluru
Date: 30 April 2026

ABSTRACT

The development of sustainable, cost-effective and efficient catalytic systems has become increasingly important for the industrial chemical processes. Carbon based materials has emerged as an efficient support material for catalytic systems due to their higher surface area, tunable porosity, excellent thermal stability, and environmental compatibility. Transition metals have gained prominence as better alternatives to conventional noble metal catalysts due to their earth abundance, versatile redox properties and cost effectiveness. In this thesis, cellulose derived carbon materials were explored as a support material for transition metal catalysts for selective oxidation and hydrogenation reaction. Moreover, investigated the catalytic potential of Mn, Co and Fe for the selected reactions. Manganese, Cobalt, and Iron supported on different cellulose derived carbon substrates such as carbon spheres, activated carbon, carbon nanoparticles, and carbon nanofibers were synthesized and systematically characterized using X-ray diffraction, Raman spectroscopy, Fourier Transform infrared spectroscopy, Brunauer-Emmett-Teller analysis, X-ray photoelectron spectroscopy, scanning electron microscopy, transmission electron microscopy and other techniques. The catalytic performance of synthesized catalysts towards the hydrogenation of vegetable oil were evaluated, addressing the challenges associated with conventional and noble metal catalysts including cost, trans fat formation and higher energy consumption. In addition, examined the applicability of carbon sphere supported manganese oxide catalyst towards the oxidation of o-cresol to salicylaldehyde under ambient conditions. The results obtained confirms that the cellulose derived carbon supported transition metal catalyst systems can offer comparable performance while improving environmental sustainability and economic feasibility. Overall, this work provides insights into the applicability of more environmentally benign and industrially viable catalytic platforms for oxidation and hydrogenation reactions.

Keywords: *Cellulose derived carbonaceous materials, transition metal oxide, catalytic conversion, sunflower oil, Heterogeneous catalysis*

Publications:

1. **T Divya**, James Arulraj, Sreeja P B, "Catalytic Conversion of 2- Methyl Phenol to Salicylaldehyde Using Manganese-Oxide Doped Cellulose-Derived Carbon Spheres," Chemistryselect, 2025, doi: 10. 10.1002/slct.202403366.

2. **Divya T** & James Arulraj. Synthesis of Cellulose formate fiber sheets by electrospinning. Indian patent.