

Dr. Subhakaran Singh Rajaputra

Ph.D. in Chemistry (Electrochemistry), M.Sc. (Organic Chemistry)



Member of RSC (London), ACS, IAENG, ISCA, BSS, ACT & ERDA

Address for correspondence

H. no.: 13-199/13, 2nd Floor, Flat no. 6, Sree Sai Madhusree Apts.
Madhusudhan nagar, Malkajgiri, Telangana, India, PIN: 500 047



subhakaransingh91@gmail.com



+91-8897531241

ORCID

0000-0003-1049-2275



<https://www.researchgate.net/profile/Subhakaran-Singh-Rajaputra>



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ID: IxDDHkoAAAAJ ID: 57224967042



VIDWAN

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RESEARCHERID



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CAREER OBJECTIVE

My primary career objective is to become a high-profile academician and a successful researcher in the field of chemistry. My previous research background and invaluable early experience of working in this area, ensure that I possess a unique and complete skill set that will enable me to flourish in this fundamentally important research area.

EXPERTISE

- Graphene synthesis
- Electrospinning nanofibers
- Polymer nanocomposites
- Flexible Supercapacitors
- Ferrofluid synthesis
- Carbon nanomaterials
- Hydrogen Production
- Cathode Electrocatalysts
- Methanol reformation

SUMMARY OF RESEARCH PUBLICATIONS (Citations: 92; h-index: 5; i10 index: 2)

Research Papers Published : **9 no.** (8 no. - indexed in SCIE / ESCI - Web of Science)
{Q1 (2 no.), Q2 (3 no.), Q3 (4 no.)}

Research Papers indexed in SCIE : **5 no.** (Average SCIE Journal Impact Factor : **4.0**)

CURRENT POSITION (Nov, 2022 – till now)



Assistant Professor
Department of Science and Humanities (Chemistry)
Malla Reddy University
Hyderabad, Telangana, India

REVIEWER FOR JOURNALS: 2 no.

- Journal of Electrochemical Science and Engineering (1847-9286) (Web of Science) **JIF: 2.2**
- International Journal of Research and Innovation in Applied Sciences (2454-6194)

PROFESSIONAL BODY MEMBERSHIPS: 7 no.

1. Member – Royal Society of Chemistry (RSC) – London, UK
 2. Standard Member – American Chemical Society (ACS) - USA
 3. Member – International Association of Engineers (IAENG) – Hong Kong SAR
 4. Life Member – Indian Science Congress Association (ISCA)
 5. Life Member – Bose Science Society (BSS) – India
 6. Life Member – Association of Chemistry Teachers (ACT) – India
 7. Life Member – Education Research & Development Association (ERDA) – India
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EDUCATION

- 2017 - 2022** **Ph.D. in Chemistry (Electrochemistry)**
Koneru Lakshmaiah Education Foundation (KLEF), A. P., India
Thesis title: “Hydrothermal Graphene Materials for Flexible Supercapacitor Applications”
Research Advisors: Dr. Anjaneyulu Yerramilli and Dr. K. Naga Mahesh
Summary of my Ph.D. thesis:
- Development of 3-4 layered Graphene based electrode materials for Supercapacitors.
 - Development of modified carbon cloth based flexible current collectors for application in Flexible Supercapacitors (FSCs).
 - Development of Graphene incorporated Gel polymer electrolytes (GPEs) for application in FSCs.
 - Fabrication and testing of Graphene based Solid-state Flexible Supercapacitors for Energy storage.
- 2012 - 2014** **M.Sc. in Chemistry (Organic Chemistry)** with 77 % aggregate
Osmania University, Hyderabad
- 2009 - 2012** **B.Sc. in Chemistry, Botany and Zoology** with 67 % aggregate
Acharya Nagarjuna University, Guntur
- 2007 - 2009** **Intermediate (Biology, Physics and Chemistry)** with 92% aggregate
Board of Intermediate Education, Andhra Pradesh
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RESEARCH EXPERIENCE (7 years)

- 2019 - 2023** **Project Title: Electrochemical Methanol Reformation Technology for Hydrogen Production**
Electroanalytical lab, Dept. of Chemistry, KLEF, A. P., India (**In-house funded**)
Publications: 3 no. (Indexed in SCIE – Web of Science) 1 no. (Under review)
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- 2021 - 2022** **Project Title: Agricultural-waste derived carbons as eco-friendly and cost-effective electrode materials for supercapacitors**
Centre for Flexible Electronics, KLEF, A. P., India (**In-house funded**)
Publications: 2 no. (Indexed in ESCI - Web of Science)
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2019 - 2021 **Project Title:** Hydrothermal Graphene Materials for Flexible Supercapacitor Applications

Centre for Advanced Energy Studies, KLEF, A. P., India (**In-house funded**)

Publications: 3 no. (Indexed in SCIE / ESCI – Web of Science)

2017 - 2019 **Project title:** Design and development of novel multifunctional polymer nanocomposite based electrospun nanofibers

Centre for Advanced Energy Studies, KLEF, A. P., India (**In-house funded**)

Outcome: Synthesized Ferrofluids and Fabricated nanofibers from polymer Nanocomposites by Electrospinning. **Publications:** 1 no. (Indexed in SCOPUS)

1. RESEARCH SKILLS

A. MATERIAL SYNTHESIS

- Synthesized **Graphene and Graphene-based materials**
 - **Induced superhydrophilic property** to carbon cloths
 - Synthesizing **Graphene-based polymer nanocomposites**
 - Synthesized Graphene-based **hybrid carbon supports** for electrocatalysts
 - Graphene/Vulcan carbon (G-C)
 - Graphene/Carbon nanotubes (G-CNTs)
 - Synthesized several **hybrid carbons supported Palladium [Pd] alloy-based cathode electrocatalysts** for **hydrogen evolution reaction [HER]**
 - Pd-Fe/G
 - Pd-Co/G
 - Pd-Co/G-C
 - Pd-Co-Ir/G-CNTs
 - Synthesized **Ferromagnetic nanoparticles and ferrofluids**
 - Synthesized **Bio-chars from Agricultural wastes** for application in energy storage
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B. FABRICATION

- Fabricated Anodes and Cathodes for **Electrochemical methanol reformation (ECMR)** by coating respective electrocatalysts on to Gas diffusion layers (GDLs)
 - Fabricated **Membrane electrode assemblies (MEAs)** by hot-pressing anode and cathode on either side of a Proton exchange membrane (Nafion 115)
 - Fabricated **Graphene-based flexible electrodes** for FSCs
 - Fabricated a Stainless steel (**SS-316**)-based cell for testing electrode materials in full-cell configuration for battery and supercapacitor applications
 - Fabricated **Solid-state flexible supercapacitors**
 - Fabricated **Polymeric nanofibers** using **Electrospinning technique**.
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C. TESTING

- Tested the **Electrochemical behaviour of as-prepared cathode electrocatalysts for HER** in-half-cell configuration by performing linear sweep voltammetry (**LSV**) and cyclic voltammetry (**CV**) and electrochemical impedance spectroscopy (**EIS**) techniques.
 - Tested the **Performance and Stability of as-prepared MEAs for Hydrogen Production** in a single ECMR cell through **Electrolysis of Aq. Methanol**.
 - Tested the **Electrochemical behaviour** of synthesized electrode materials in **half-cell configuration** for application in supercapacitors.
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- Tested the **Supercapacitive behaviour of fabricated supercapacitors** using electrochemical workstation by performing **(CV)**, galvanostatic charge-discharge **(GCD)** and **(EIS)** techniques.

2. TECHNICAL SKILLS

- **(2017-2021) - Five (5) years of experience** in maintaining **Sophisticated Instrumentation Lab** and a **Wet Chemical Lab** in Centre for Advanced Energy Studies (CAES), KLEF (Deemed to be University), A. P., India

A. INSTRUMENTS HANDLED

- **Electrochemical Characterization** (*PARSTAT PMC2000 - Electrochemical workstation*)
Working experience in electrochemical techniques like cyclic voltammetry (CV), galvanostatic charge-discharge (GCD) studies and electrochemical impedance spectroscopy (EIS).
- **Membrane electrode assembly (MEA) fabrication** (*Manual hot press*)
Working experience in fabrication of MEAs by sandwiching pretreated Nafion® 115 proton exchange membranes with graphene coated carbon cloth (Gas diffusion layers) on either side.
- **Electrochemical methanol reformation (ECMR)** (*Assembled PEM electrolyzer setup*)
Working experience in testing and performance evaluation of MEAs fabricated using Pd based electrocatalysts for hydrogen production in single ECMR cell
- **Electrospinning Technique** (*Super ES-2 Electrospinning unit*)
Working experience in development of multifunctional polymeric nanofibers and fabrication of membranes for filtration of aqueous and non-aqueous liquids.
- **Chemical vapour deposition (CVD) technique** (*Locally assembled CVD unit*)
Working experience in synthesizing carbon nanomaterials through CVD of acetylene (C₂H₂) gas under N₂ atmosphere
- **Atomic adsorption spectroscopy (AAS)** (*Atomic adsorption spectrophotometer - AA500*)
Working experience in characterization of aqueous samples for determination of metal concentration using flame adsorption spectroscopy
- **X-ray diffraction (XRD)** (*Malvern Panalytical Empyrean X-ray diffractometer*)
Working experience in characterizing crystalline properties of synthesized graphene-based materials, Pd based electrocatalysts and magnetic nanomaterials
- **Fourier transform infrared spectroscopy (FTIR)** (*Jasco FT/IR-4700*)
Working experience in determination of functional groups in graphene-based materials and modified carbon cloths
- **UV-Visible spectroscopy** (*UV-Visible spectrophotometer - UV 3000+*)

B. SOFTWARE SKILLS

- **Experienced in Origin Pro** (Data analysis and Graphing software), **X'Pert HighScore** (XRD analysis software) and **VersaStudio** (Electrochemical data analysis software)
- **Proficient with Microsoft Word, Excel, and PowerPoint**

RESEARCH PUBLICATIONS

PUBLISHED RESEARCH ARTICLES: **(9 no.) (8 no. indexed in SCIE / ESCI - Web of Science)**

1. Pennada, N., Rajaputra, S. S., Brahman, P., Development of ternary Pd-Co-Ir metal nanoparticles decorated on Graphene-CNTs hybrid support: An efficient electrocatalyst for hydrogen production from methanol reformation. *Electrochimica Acta*, 432, 2022, 141229. <https://doi.org/10.1016/j.electacta.2022.141229> **(SCIE - Web of Science) (J. I. F. – 5.5) (Q1)**
 2. Pennada, N., Rajaputra, S. S. & Brahman, P., Binary Pd-Co alloy nanoparticles decorated on graphene-Vulcan carbon hybrid support: An efficient and cost-effective electrocatalyst for hydrogen evolution reaction in electrochemical methanol reformation. *Journal of*
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3. Pennada, N., **Rajaputra, S. S.** & Brahman, P., Development of Novel Electrocatalyst Based on Graphene Supported Palladium-cobalt Nanoparticles as Hydrogen Evolution Catalyst for the Cost-Effective Production of Hydrogen from Methanol. *Electroanalysis*, 34(9), 2022, 1387-1401. <https://doi.org/10.1002/elan.202200029> (SCIE - Web of Science) (J. I. F. – 2.9) (Q2)
4. **Rajaputra, S. S.**, Pennada, N., & Yerramilli, A. & Naga Mahesh, K., Comparative electrochemical performance evaluation of chemically (CRG) and hydrothermally (HRG) reduced graphene oxide as supercapacitor electrode material. *Ionics*, 27(9), 2021, 4069-4082. <https://doi.org/10.1007/s11581-021-04144-4> (SCIE - Web of Science) (J. I. F. – 2.4) (Q2)
5. **Rajaputra, S. S.**, Pennada, N., Yerramilli, A., & Naga Mahesh, K., Hydrothermally Reduced Graphene Oxide-Coated Carbon Cloth for Flexible Supercapacitors. *Journal of Electrochemical Energy Conversion and Storage*, 18(4), 2021, 041008. <https://doi.org/10.1115/1.4051143> (SCIE - Web of Science) (J. I. F. – 2.7) (Q2)
6. Nersu, V. N. K. S. K, Annepu, B. R., **Rajaputra, S. S** & Patcha, S. S. B., Char of Tagetes erecta (African marigold) flower as a potential electrode material for supercapacitors. *Journal of Electrochemical Science and Engineering*, 12(4), 2022, 787-797. <https://doi.org/10.5599/jese.1381> (ESCI - Web of Science) (J. I. F. – 2.2) (Q3)
7. Nersu, V. N. K. S. K, Annepu, B. R., Patcha, S. S. B. & **Rajaputra, S. S.**, Rice husk char as a potential electrode material for supercapacitors. *Journal of Electrochemical Science and Engineering*, 12(3), 2022, 451-462. <http://dx.doi.org/10.5599/jese.1310> (ESCI - Web of Science) (J. I. F. – 2.2) (Q3)
8. **Rajaputra, S. S.**, Pennada, N., Yerramilli, A., & Kummara, N. M., Graphene based sulfonated polyvinyl alcohol hydrogel nanocomposite for flexible supercapacitors. *Journal of Electrochemical Science and Engineering*, 11(3), 2021, 197-207. <https://doi.org/10.5599/jese.1031> (ESCI - Web of Science) (J. I. F. – 2.2) (Q3)
9. Kamakshi, T., Sundari, G. S., Erothu, H., & **Singh, R. S.**, Effect of nickel dopant on structural morphological and optical characteristics of Fe₃O₄ nanoparticles. *Rasayan J. Chem*, 12(2), 2019, 531-536. <http://dx.doi.org/10.31788/RJC.2019.1225054> (Indexed in SCOPUS) (Q3)

ACHIEVEMENTS

- Received **Best Poster Award** at 7th PhD Poster Symposium on “Chemistry and Biology Interface”, January 19th, 2019, conducted by the **Royal Society of Chemistry (London) – IDLS, NIPER, Hyderabad**
- Received **Best Poster Award** at 1st International Conference on Pure and Applied Chemistry (IconPAC-2019), March 8th – 9th, 2019, KLEF (Deemed to be University), Vaddeswaram, A. P.

ORGANIZATIONAL EXPERIENCE

- Enacted as **NAAC Co-Ordinator**, School of Sciences, Malla Reddy University, Hyderabad, Telangana, 2024.
 - Enacted as **Member of Centre for Teaching & Learning**, Malla Reddy University, Hyderabad, Telangana, 2024.
 - Enacted as **Student Scholarship Co-Ordinator**, School of Sciences, Malla Reddy University, Hyderabad, Telangana, 2024.
 - Enacted as **Member of the Discipline Committee** for SAARANG 2K24, organized in Malla Reddy University, Hyderabad, Telangana, Oct 4th, 2024.
 - Enacted as **Class In-charge** for Graduate Students, School of Sciences, Malla Reddy University, Hyderabad, Telangana, 2023-24.
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- Enacted as **In-charge of Department Library**, School of Sciences, Malla Reddy University, Hyderabad, Telangana, 2024.
- Enacted as **Student Call-log data Co-Ordinator**, School of Sciences, Malla Reddy University, Hyderabad, Telangana, 2024.
- Enacted as **Co-Ordinator of Science Quiz**, conducted as a part of ALL GO RYTHMS 2K24, organized on the occasion of National Science Day in School of Sciences, Malla Reddy University, Hyderabad, Telangana, Feb 16th, 2024.
- Enacted as a **leader of an Asset management team** and successfully accomplished the survey, identification and enrollment of available assets of KLEF (Deemed to be University), Vaddeswaram, A. P., during April 12th – June 20th, 2019
- Played a **major role in organizing** the **1st International Conference on Pure and Applied Chemistry (IconPAC-2019)**, March 8th – 9th, 2019, Department of Chemistry, KLEF (Deemed to be University), Vaddeswaram, A. P.
- Played an **active role as a member of the organizing committee** in **“Science Fair for Rural Community Awareness”**, a programme of NCSTC, DST (Govt. of India) and KLEF from December 10th – 12th, 2018, KLEF (Deemed to be University), Vaddeswaram, A. P.
- Played a **key role in organizing** a **One Day Workshop** on “Innovative Approaches in Nanotechnology”, November 11, 2018, Centre for Advanced Energy Studies, KLEF (Deemed to be University), Vaddeswaram, A. P.
- Played a **key role in organizing** a **One-day workshop** “Need for Quality and Context in Engineering and Sciences Research”, on September 29th, 2018, KLEF (Deemed to be University), Vaddeswaram, A. P.

CONFERENCES AND WORKSHOP PARTICIPATION

- Attended **ACS Science Talk** on “Advances in semiconducting polymer synthesis” by Prof. Christine Luscombe, Chair of the Faculty Assembly, Okinawa Institute of Science and Technology (**OIST**), **Japan**, September 20th, 2023.
 - Attended **ACS Science Talk** on “Innovation in Nanomaterials Synthesis: from Lab to Commercialization” by Dr. Il-Doo Kim, Chair Professor, Korea Advanced Institute of Science and Technology (**KAIST**), **South Korea**, September 15th, 2023.
 - Attended **ACS Science Talk** on “The Industrial Ecosystem of Si Chips and Atomic Layer Deposition as a Key Nanofabrication Technology” by Prof. Han-Bo-Ram Lee, Incheon National University, Incheon, **South Korea**, September 8th, 2023.
 - Attended **ACS Science Talk** on “Control of Surface Structures and Molecular Orientation in Thin Film for Organic Electronics” by Prof. Keisuke Tajima, RIKEN Center for Emergent Matter Science (**CEMS**), **Saitama, Japan**, September 1st, 2023.
 - Attended **International Workshop** on “Flexible Hybrid Electronics – Manufacturing Processes and Applications”, October 4th – 8th, 2021, Electronics and Communication Engineering & IETE, KLEF (Deemed to be University), Vaddeswaram, A. P.
 - Attended **One-week Faculty Development program (FDP)** on “Integration of Renewable Energy and Smart Grids for Smart Cities”, June 14th – 19th, 2021, IoT AND Renewable Energy & Smart Cities Stream, Microelectronics Research Group (MERG) & IETE, KLEF (Deemed to be University), Vaddeswaram, A. P.
 - **Oral Presentation at Two-day National Conference** on “Suitable technology and Development – Environmental Impacts” February 22nd – 23rd, 2021, Dept. of Chemistry, KLEF (Deemed to be University), Vaddeswaram, A. P.
 - Attended **Two-Day National Workshop** on “Introduction to Origin Software”, September 29th - 30th, 2020, Department of Physics, KLEF (Deemed to be University), Vaddeswaram, A. P.
 - **Oral Presentation at One Day Workshop** on “Innovative Approaches in Nanotechnology”, November 11th, 2018, KLEF (Deemed to be University), Vaddeswaram, A. P.
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- **Poster Presentation at 2nd International Conference** on Nano Science & Engineering Applications (ICONSEA-2018), October 4th – 6th, 2018, organized by Centre for Nano Science and Technology, Institute of Science and Technology, JNTUH in collaboration with **Centre for Advanced Materials (CAM), QATAR University, Qatar**, held at IST, JNTUH, Hyderabad, India.
 - Attended **One Day International Pre-Conference Workshop**, October 3rd, 2018, organized by Centre for Nano Science and Technology, Institute of Science and Technology, JNTUH in collaboration with **Centre for Advanced Materials (CAM), QATAR University, Qatar**, held at IST, JNTUH, Hyderabad, India.
 - **Oral Presentation at National Conference** on Current Developments in Functional Materials and their Applications (NCDFMA-2017), December 22nd – 23rd, 2017, KLEF (Deemed to be University), Vaddeswaram, A. P.
 - **Poster Presentation at One Day National Workshop** on Recent Trends in Analytical Techniques for Drug Discovery and Pharmaceutical Drug Development, October 28th, 2017, conducted by the **Royal Society of Chemistry (London) – IDLS**, KLEF (Deemed to be University), Vaddeswaram, A. P.
 - Attended **National Workshop on Advanced Material Characterization Techniques (NWAMCT-2018)**, August 31, 2018, Department of Physics, University College of Science, Osmania University, Hyderabad, India.

PERSONAL DETAILS

Full name : **Rajaputra Subhakaran Singh**
Father's name : R. Srinivas Singh
Date of Birth : **6th May, 1991**
Marital status : Single
Blood group : O +ve
Nationality : Indian
Languages known : English, Hindi and Telugu

DECLARATION

I hereby declare that the information given above is true to the best of my knowledge and belief.

Yours sincerely,

Place: Hyderabad

Signature:

Date: 23rd Oct, 2024

Print name: **Rajaputra Subhakaran Singh**