

SAI PRASAD NAYAK

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SUMMARY

Experienced in the field of nanotechnology and electrochemistry enabling collaborations with international organizations, solving vital research problems related to detection of biomolecules and fuel cell applications thereby publishing high impact research works.

EDUCATION

Doctor of Philosophy in Chemistry, Sri Sathya Sai Institute of Higher Learning, India. (2017 – July, 2022; CGPA:7.8). Topic: “Green nanocomposites as electrocatalysts for detection of biomolecules and fuel cell applications”.

Master of Science in Chemistry, Sri Sathya Sai Institute of Higher Learning, India, Graduated with **a gold medal** for academic excellence (2015 - 2017; CGPA: 8.2).

Bachelor of Science, Chemistry (Hons), Utkal University, India., (2012 - 2015; CGPA: 7.2).

RESEARCH EXPERIENCE

- Developed an energy-efficient process for galvanostatic deposition of a novel porous gold-curcumin nanocomposite as a thin film on the electrode surface for fuel cell applications
- Interpreted the mechanism behind the electrochemical synthesis of gold-curcumin nanocomposite which could be applicable to similar metal-ligand combinations.
- Engineered the gold-curcumin electrode surface, for picomolar and real-time detection of dopamine in human urine samples.
- Synthesized reduced graphene oxide decorated with silver nanoparticles using plant extracts for electrochemical detection of dopamine and uric acid.
- Spin coated various silver halloysite architectures on silver slides and recorded their Surface Plasmon Coupled Emission properties with a hand-held spectrophotometer, and a cell-phone as a next-gen plasmonic sensor.
- Used Gaussian 16 to optimize metal-organic complexes and calculated their complex forming energy, and adsorption energy.
- Assisted in a project entitled “ANIRVID” aiming at discovering depression biomarker in perinatal Indian women population, where I supported in data collection as well as sample processing, preservation and biochemical analysis.

RESEARCH INTEREST

Catalysis, Nanomaterials, Graphene, Electrosynthesis, Fuel cells, Sensors.

SKILLS

Critical thinking, Problem solving, Teamwork, Leadership, Project Management, Collaboration.

TECHNICAL SKILLS

XRD, TEM/SEM, EDX, UV, IR, TGA, DLS, BET, Raman, Electrochemical techniques along with handling potentiostat.

PROFESSIONAL EXPERIENCE

- Reviewed manuscripts of Internationally reputed journals such as Elsevier and Nature
- Taught “ENT 201-Environmental science and Human values” course to the first year Bachelor of Science and Commerce students comprising a class of 70 students
- Participated in the Sakura Science Exchange Programme, 2019, worked at *Matsumi laboratory, JAIST, Japan* on the project “Solar power assisted green synthesis of silver-graphite nanocomposite using titanium dioxide as a reducing agent”.

PUBLICATIONS

- **Nayak S. P.**, Lakshman K. V., Ramamurthy S. S., Kumar J. K. K. and Rao A.M., Green Synthesis of a Novel Porous Gold-curcumin Nanocomposite for Super-Efficient Alcohol Oxidation, **Nanoenergy**, 2022.
- **Nayak S.P.**, Srinivasan V., Badiya P.K., Kumar J.K., Ramamurthy S.S., Engineering metal-dielectric nanostructures involving silver decorated Halloysite for augmented surface plasmon-coupled directional emission, **Physica E Low Dimens. Syst. Nanostruct.**, p.114718, 2021.
- **Nayak S. P.**, Ramamurthy S. S., and Kumar J. K., Green Synthesis of Silver Nanoparticles Decorated Reduced Graphene Oxide Nanocomposite as an Electrocatalytic Platform for the Simultaneous Detection of Dopamine and Uric Acid, **Mater. Chem. and Phys.**, 252, 123302, 2020.
- Badiya P. K., Siddabattuni S., Dey D., Javvaji S. K., **Nayak S. P.**, Hiremath, A. C., ... & Vaitheswaran S., Identification of clinical and psychosocial characteristics associated with perinatal depression in the south Indian population, **Gen. Hosp. Psychiatry**, 66, 161-170, 2020.
- Badiya, P.K., Srinivasan, V., **Nayak S.P.**, S.S. Ramamurthy, Low-Cost Plasmonic Carbon Spacer for Surface Plasmon-Coupled Emission Enhancements and Ethanol Detection: a Smartphone Approach. **Plasmonics** **13**, 519–524, 2018.
- **Nayak S.P.**, Lakshman K. V., Kumar J. K. K. and Rao A.M., A porous gold-curcumin nanocomposite for picomolar dopamine detection and real-time ultra-selective detection of dopamine in urine, (*communicated to ACS material letters*).
- **Nayak S.P.**, Lakshman K. V., Kumar J. K. K. and Rao A.M, Porous Gold-Curcumin Nanocomposite for Enhanced Electrooxidation of Glycerol and Ethylene glycol (*Under preparation*).
- **Nayak S.P.**, V. Pratyusha, Kumar J. K. K., Eco-friendly Surface Modification of Oxidized Carbon Nanotubes with Curcumin for Simultaneous Electrochemical Detection of Dopamine and Serotonin (*under review in Material Chemistry and Physics*)

CONFERENCES

- **Nayak S. P.**, Lakshman K. V., Ramamurthy S. S., Kumar J. K., & Rao A. M., Enhanced Hydrogen Evolution Reaction by Porous Curcumin Enveloped Gold Nanoparticles, **ECS Meeting Abstracts** (No. 54, p. 1884). IOP Publishing, 2021.
- **Nayak S. P.**, Ramamurthy S. S., & Kumar J. K., Electrodeposition of Gold Nanoparticles on Halloysite Nanotubes Modified Glassy Carbon Electrode for Detection of Dopamine and Serotonin, **ECS Meeting Abstracts** (No. 56, p. 1442), IOP Publishing, 2021.

INVITED TALK

- 3rd International conference on “Biocatalysis and Green Chemistry” on the topic “green synthesis of a novel porous gold-curcumin nanocomposite for efficient alcohol oxidation” in April, 2022, organized by Coalesce research group, USA.

VOLUNTEERING

- Coordinated various field-events as part of annual sports and cultural meet, Sri Sathya Sai Institute of Higher Learning during 2018-2020.
- Led a self-reliance group of 15 students in the institute for maintenance of college playground and 4 students for systematic functioning of hostel photocopy department.
- Trained students for various competitive exams (e.g., B.Ed., D.Ed.) in chemistry and physics.
- Elected as the "Student Representative" in the department of chemistry to facilitate colloquiums, talks, and welcome/farewell functions during the bachelor's program.

EXTRA-CURRICULAR ACTIVITIES

Singing, Elocution, Reading, Veda-chanting, Marathons, Social service.