Dr. Manorama

Assistant Professor

Guru Ghasidas Vishwavidyalaya
(Central University)
Department of Chemistry
Bilaspur, C. G. – 495 009

Email: manoramabhu@gmail.com

Experience:

07 Years as Assistant Professor (w.e.f. 16th August, 2011), Department of Chemistry, GGV, Bilaspur.

Education:

Ph.D. (2011), Chemistry, Banaras Hindu University, Varanasi-221005, India.

M. Sc. (2005), Analytical Chemistry, Banaras Hindu University, Varanasi-221005, India.

B. Sc. (2003), VBS Purvanchal University, Jaunpur, U.P. India

Fellowships/Awards:

CSIR-UGC NET-LS (2005)

CSIR-Project–JRF (2006-2009) worked at Banaras Hindu University, Varanasi-221005, India.

Awarded SRF from CSIR (No. 9/13(286)/2010-EMR-I): (2010- 2011) worked at Banaras Hindu University, Varanasi-221005, India.

Best Oral Presentation Award: In National Seminar organized by *Indian Society of Analytical Scientists*, at Hyderabad Chapter & Indian Institute of Chemical Technology (IICT), Hyderabad on Jan 20-21, 2011.

Research Project:

S. No.	Title of the Project, Sanctioned Order No. & Date	Amount Sanctioned	Funding Agency	Duration
1	A Novel Amperometric Pesticide Biosensor for Organophosphates/Carbamates Based on Acetyl Cholinesterase Immobilized on Graphene-Gold Nanoparticles (AuNPs) Composite Sanction Order No: 42-299/2013(SR); Date: 25th March, 2013	Rs. 12,40,800/	UGC	3 Years

Ph. D. Students: Three (03) Ph. D. students are currently enrolled Under my supervision:

1. **Anjumala Sahu**
2. **Hemant Kashyap (NET-LS)**
3. **Smita R. Bhardiya (CSIR-JRF)**

Membership (Professional Bodies):

Life Member of Indian Society for Electroanalytical Chemistry (ISEAC).

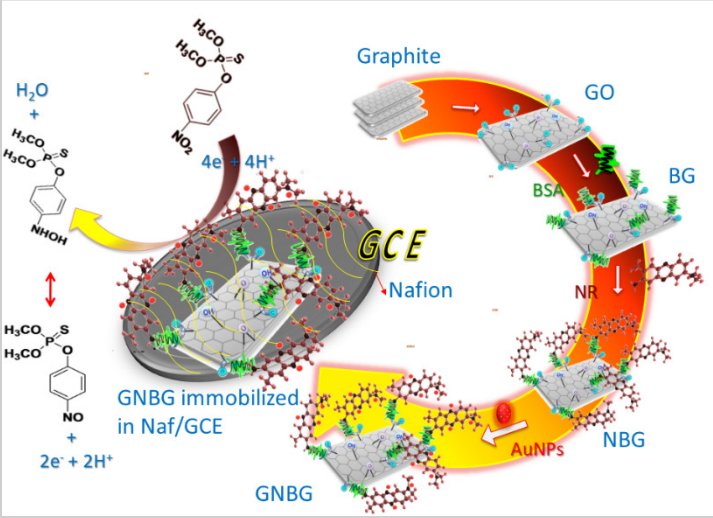
Life Member of Indian Science Congress.

Research Publications (25) [Average Impact factor: 3.12]

1. *AuNPs/Neutral red-biofunctionalized graphene nanocomposite for nonenzymatic electrochemical detection of organophosphate via NO_2 reduction*

Manorama Singh, H. Kashyap, P. K. Singh, S. Mahata, V. K. Rai, A. Rai

***Sensors & Actuators: B. Chemical,* 2019 (In press) [Impact Factor: 5.67]**

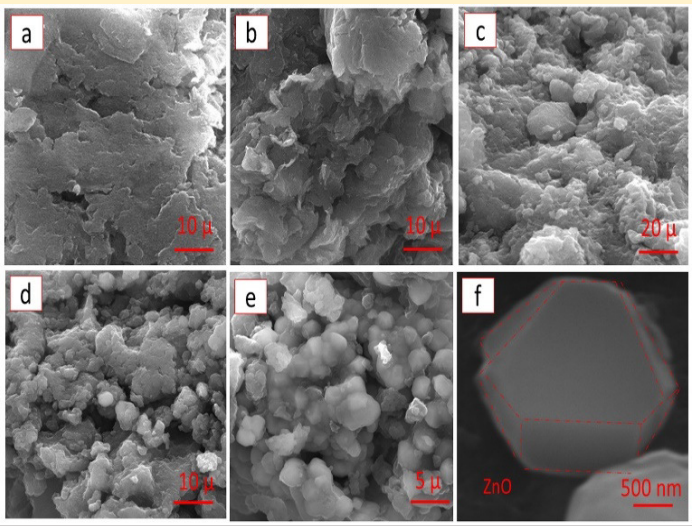


The synthesis of AuNPs/neutral red-bio-functionalized graphene is reported and demonstrated as efficient platform for sensitive detection of hazardous organophosphate pesticide 'Methyl Parathion' *via* reduction of $-NO_2$ group.

2. *Efficient electrocatalytic oxidation of p-phenylenediamine using a novel PANI/ZnO anchored bio-reduced graphene oxide nanocomposite*

Manorama Singh, A. Sahu, S. Mahata, P. Shukla, A. Rai, V. K. Rai

***New J. Chem.* 2019**, DOI: 10.1039/C9NJ00837C. **[Impact Factor: 3.277]**



A novel approach was reported for the fabrication of polyaniline/ZnO-anchored bio-reduced graphene oxide nanocomposite *via in-situ* chemical polymerization of aniline doped with bio-reduced GO and ZnO through π-π interaction and electrostatic interaction.

3. *A Facile Iodine-Promoted N-Ts Insertion into Enals: cis-Selective Construction of Aziridin-2-aldehyde in Water*

P. K. Singh, F. Verma, S. R. Bhardiya, **Manorama Singh**, V. K. Rai, A. Rai

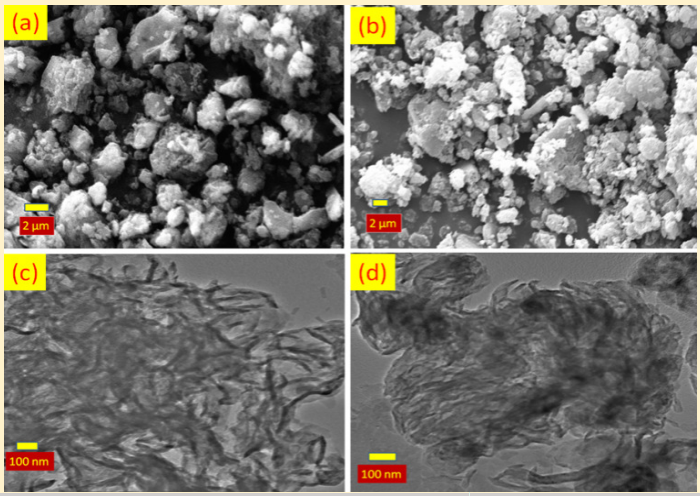
***Chemistry Select,* 2019**, *4*, 1240-1243. **[Impact Factor: 1.5]**

Direct I_2-catalyzed novel aziridination of *[E]*-cinnamaldehyde using Chloramine–T as nitrogen transfer agent and BTEAC as phase transfer catalyst is reported. Operational simplicity, excellent yield of pure products (84-93%), excellent diastereoselectivity (95-99%) in favour of *cis* isomer, ambient reaction conditions and using water as

solvent are the salient features of envisaged methodology for direct conversion of enals into tosylaziridines.

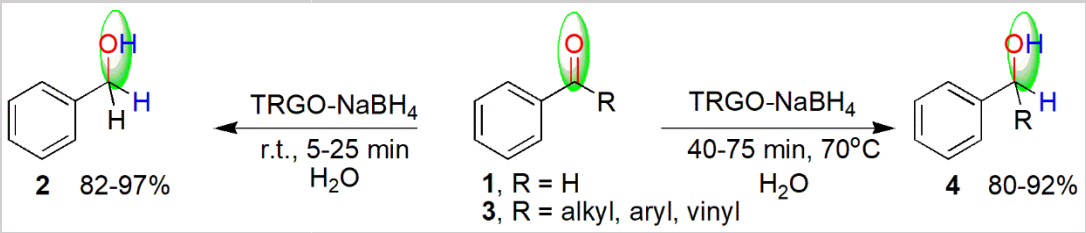
4. *Photocatalytic C(sp^3)–H activation towards α-methylenation of ketones using MeOH as 1C source steering reagent*
F. Verma, P. Shukla, S. R. Bhardiya, **Manorama Singh**, A. Rai, V. K. Rai

***Advanced Synthesis & Catalysis*, 2019**, 361, 1171-1462. **[Impact Factor: 5.123]**



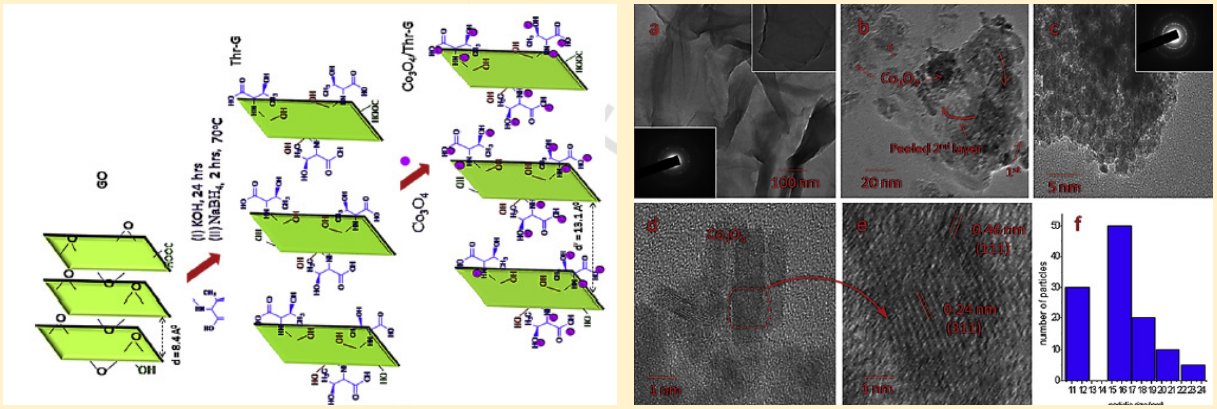
Unprecedented direct access to terminal enones *via* α-methylenation of aryl ketones to form C=C bond is achieved under visible-light conditions using methanol as one carbon source substrate and solvent as well. The reaction involves Cu@g-C_3N_4-catalysed *in situ* oxidation of methanol into formaldehyde followed by dehydrative cross aldol type reaction.

5. *A novel carbocatalytic hydride transfer strategy for efficient reduction of structurally different aldehydes and ketones in water*
V. K. Rai, S. Mahata, S. R. Bhardiya, P. Shukla, A. Rai, **Manorama Singh**
***Tetrahedron Lett.*, 2019**, *60*, 524-529. **[Impact Factor: 2.660]**



Reduced graphene oxide (rGO)-$NaBH_4$ is reported as mild and efficient catalyst-system for chemo-/regioselective reduction of structurally different aliphatic, aromatic as well as α,β-unsaturated aldehydes and ketones in water.

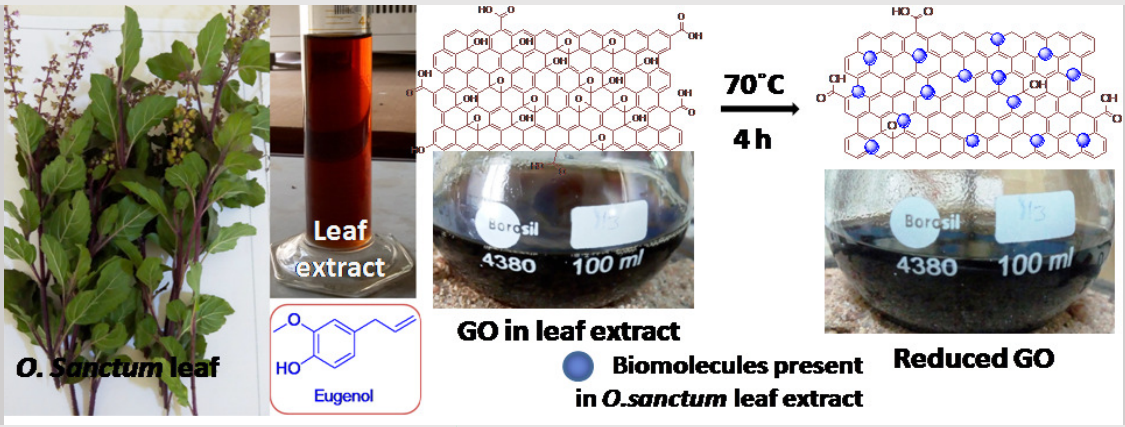
6. *First bio-covalent functionalization of graphene with threonine towards drug sensing via electrocatalytic transfer hydrogenation*
A. Sahu☐, P. Shukla, S. Mahata, V. K. Rai, A. Rai, **Manorama Singh**
***Sensors & Actuators*: *B. Chemical*, 2019**, *281*, 1045-1053, **[Impact Factor: 5.67]**



An unprecedented bio-covalent functionalization of graphene with threonine through N-nucleophilic epoxide-ring opening

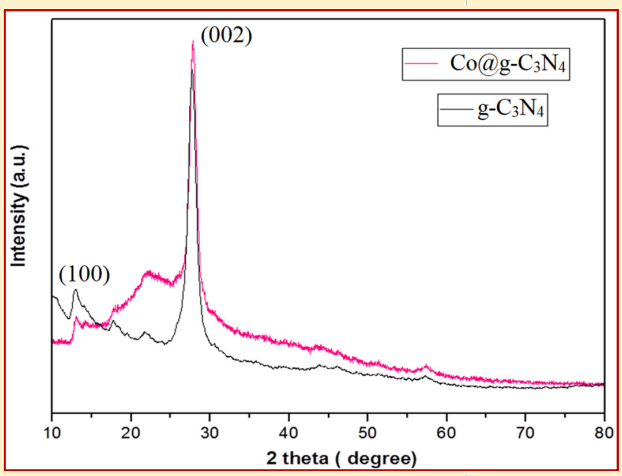
followed by its embellishment with Co-spinel is reported.

7. *A novel and efficient reduction of graphene oxide using Ocimum sanctum L. leaf extract as an alternative renewable bio-resource*
S. Mahata, A. Sahu, P. Shukla, A. Rai, **Manorama Singh**, V. K. Rai
***New J. Chem.* 2018** (DOI: 10.1039/C8NJ04086A) **[Impact Factor: 3.277]**



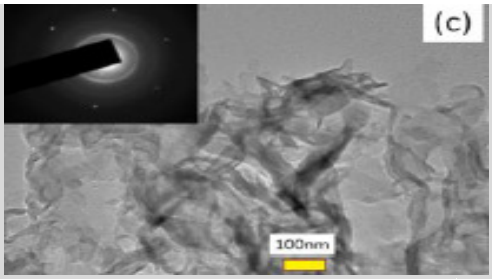
An efficient, rapid, bio-inspired synthesis of reduced graphene oxide (rGO) nanosheets was explored using the green leaves extract of *Ocimum sanctum* L. (Tulsi leaves).

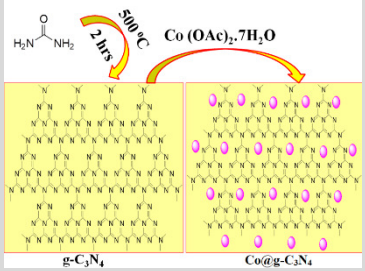
8. *Visible Light-Induced Direct Conversion of Aldehydes into Nitriles in Aqueous Medium Using Co@g-C_3N_4 as Photocatalyst*
F. Verma, P. Shukla, S. R. Bhardiya, **Manorama Singh**, A. Rai, V. K. Rai
***Cat. Comm.* 2019**, 119, 76-81. **[Impact Factor: 3.46]**

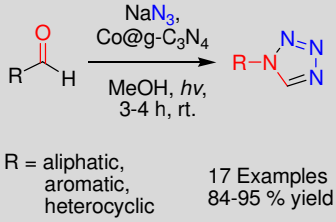


Unprecedented Co@g-C_3N_4 catalyzed visible light driven efficient conversion of a variety of aldehydes into corresponding nitriles is reported.

9. *Visible-light driven regioselective synthesis of 1H-tetrazoles from aldehydes through isocyanide-based [3+2] cycloaddition*
F. Verma, A. Sahu, P. K. Singh, A. Rai, **Manorama Singh**, V. K. Rai
***Green Chem.* 2018**, *20*, 3783-3789. **[Impact Factor: 9.125]**







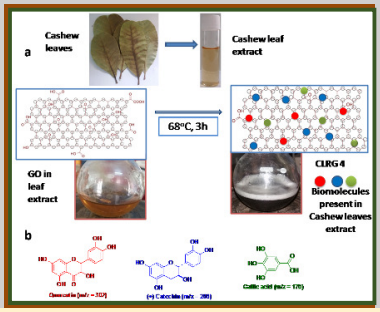
A novel and green Co@g-C_3N_4 catalyzed visible light driven direct regioselective synthesis of 1*H*-tetrazoles directly from various aldehydes and sodium azide is reported.

10. *One-Pot Allan–Robinson/Friedländer Route to Chromen-/Quinolin-4-ones through the Domino Acetylative Cyclisation of 2-Hydroxy-/2-Aminobenzaldehyde*
V. K. Rai, F. Verma, G. P. Sahu, **Manorama Singh**, A. Rai

***Eur. J. Org. Chem.* 2018, 537-544. [Impact Factor: 3.129]**

11. *Bio-inspired unprecedented synthesis of reduced graphene oxide: a catalytic probe for electro-/chemical reduction of nitro groups in an aqueous medium,*
S. Mahata, A. Sahu, P. Shukla, A. Rai, **Manorama Singh**, V. K. Rai

***New J. Chem.* 2018, *42*, 2067-2073. [Impact Factor: 3.277]**



The first green reduction of graphene oxide (GO) using cashew leaf extract as bio-renewable catalyst containing water soluble tannins and gallic acid is reported herein. The synthesized rGO has been well characterized by TEM, SEM, XRD, FTIR, Raman, UV-Vis spectroscopy and cyclic voltammetry.

12. *Graphene oxide catalyzed C-N/C-S/[3+2] cyclization cascade for green synthesis of thiazolidinone in water*
S. Mahata, A. Sahu, P. Shukla, A. Rai, **Manorama Singh**, V. K. Rai

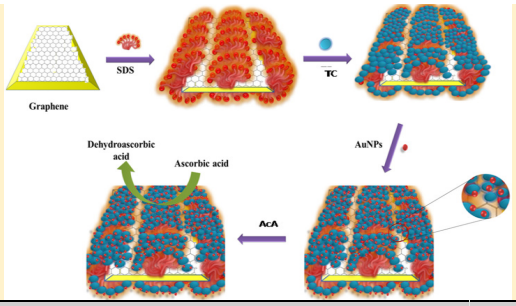
***Lett. Org. Chem.* 2018, *15*, 665-672. [Impact Factor: 1.200]**

13. Morita-*Baylis-Hillman enal-based triple cascade strategy for anti-selective synthesis of highly functionalized tetrahydropyridines using iminium-enamine catalysis*
V. K. Rai, F. Verma, M. Satnami, **Manorama Singh**, A. Rai

***Tetrahedron Lett.*, 2018, *59*, 1783–1786. [Impact Factor: 2.660]**

14. *Facile construction of AuNPs modulated SDS wrapped G-TC tailored electrode for sensitive detection of ascorbic acid*
H. Kashyap, P. K. Singh, F. Verma, V. K. Rai, A. Rai, **Manorama Singh**

***New J. Chem.* 2017, *41*, 4937-4942. [Impact Factor: 3.277]**

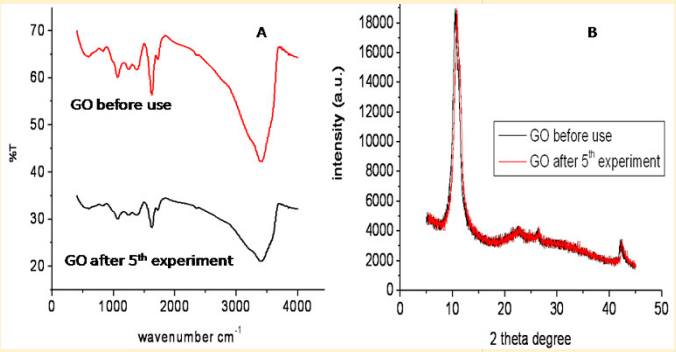


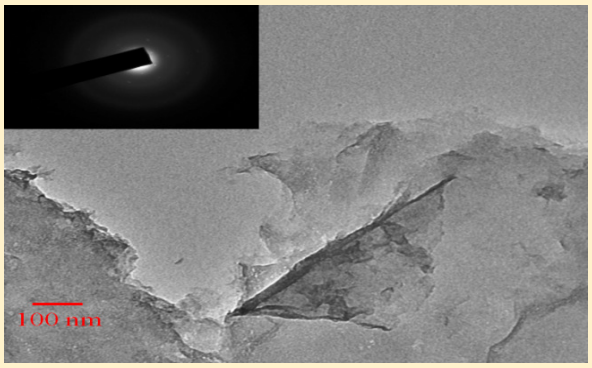
A rapid and sensitive tailor-made electrode based on the gold nanoparticles (AuNP's) modulated hydrophilic sodium dodecylsulphate (SDS) wrapped graphene (G)-Tolonium chloride (TC) (GSTG) nanocomposite was designed step-by-step in an easy and green way for the detection of ascorbic acid (AcA).

15. *A co-operative effect of visible light photo-catalysis and $CoFe_2O_4$ nanoparticles for green synthesis of furans in water*
F. Verma, P. K. Singh, S. R. Bhardiya, **Manorama Singh**, A. Rai, V. K. Rai
***New J. Chem.* 2017**, *41*, 4937-4942. **[Impact Factor: 3.277]**

A novel approach to poly-functionalized furan synthesis is disclosed via oxidative decarboxylative [3+2] cycloaddition using co-operative catalysis by visible light and $CoFe_2O_4$ nanoparticles at ambient reaction condition in water as solvent. The synthesized NP has been well characterized by TEM, SEM, XRD, FTIR, Raman and UV-Vis spectroscopy.

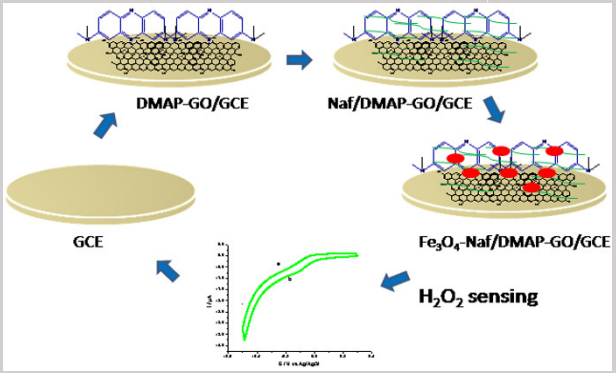
16. *First graphene oxide promoted metal-free nitrene insertion into olefins in water: towards facile synthesis of activated aziridines*
P. Shukla, S. Mahata, A. Sahu, **Manorama Singh**, V. K. Rai, A. Rai
***RSC Advances*, 2017**, 7, 48723–48729. **[Impact Factor: 3.289]**





A facile metal-free graphene oxide (GO)-catalyzed synthesis of tosylaziridines using PhI=NTs as nitrene source is reported. The reaction involves nitrene insertion to a variety of styrene/nitrostyrene derivatives in presence of iodine at room temperature in water.

17. *Decoration of GO with Fe spinel-Naf/DMAP: an electrochemical probe for sensing H_2O_2 reduction,*
Manorama Singh, S. R. Bhardiya, H. Kashyap, F. Verma, V. K. Rai, I. Tiwari
***RSC Advances*, 2016**, *6*, 104868-104874. **[Impact Factor: 3.289]**



An unprecedented and highly selective non-enzymatic electrochemical sensor is developed on glassy carbon electrode with Fe_3O_4 decorated Naf/DMAP linked graphene oxide (Fe_3O_4-Naf/DMAP-GO) nanohybrid film via electrostatic interaction of cationic organic compound with negatively charged oxygen containing groups ($-COO^-$ and –O) available on the edge of graphene oxide (GO).

18. *A facile anti-selective synthesis of 3-nitropyridin-2-ones using Morita-Baylis Hillman adduct of nitroalkene*

V. K. Rai, G. P. Sahu, **Manorama Singh**, A. Rai

***Lett. Org. Chem.* 2016**, *13,* 547-553. **[Impact Factor: 1.200]**

19. *Fabrication, characterization and application of carbon ceramic nanocomposite prepared by using multiwalled carbon nanotubes and organically modified sol-gel glasses*

I. Tiwari, **Manorama Singh**, K. P. Singh

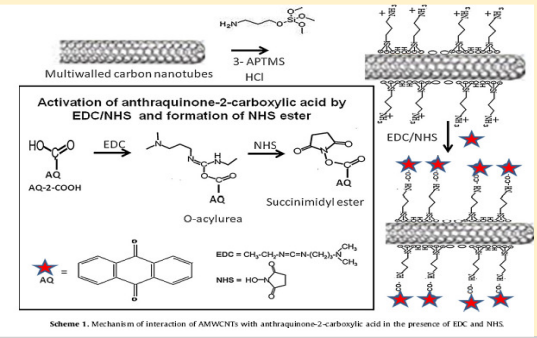
***J. Indian Chem. Soc.* 2014**, *91*, 1793-1798.

We herein report the development of carbon ceramic nanocomposite nano-electrodes by incorporation of multiwalled carbon nanotubes (MW CNTs) in organically modified sol-gel glass (Ormosil) matrix which is derived from silane precursors. The ceramic composite was modified with the incorporation of MWCNTs, a redox mediator ferricyanide and the enzyme Horseradish peroxidase (HRP).

20. *Electroanalytical properties and application of anthraquinone derivative- functionalized multiwalled carbon nanotubes nanowires modified glassy carbon electrode in the determination of dissolved oxygen*

I. Tiwari, **Manorama Singh**, M. Gupta, S. K. Aggarwal

***Materials Research Bulletin*, 2012**, *47, 1697-1703* **[Impact Factor: 2.47]**



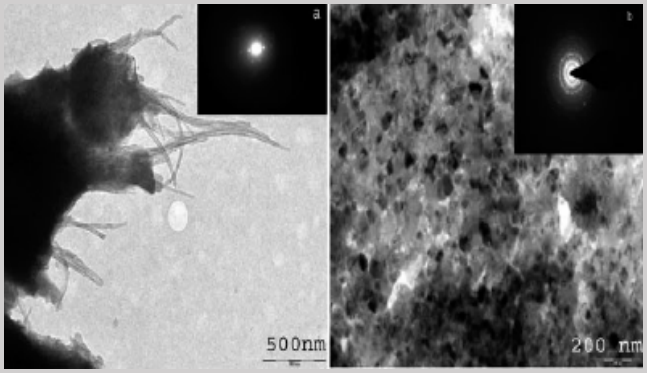
Scheme 1. Mechanism of interaction of AMWCNTs with anthraquinone-2-carboxylic acid in the presence of EDC and NHS.

We have reported a simple, low cost and green preparation of nanowires of (anthraquinone-2-carboxylic acid/amino functionalized) multiwalled carbon nanotubes (HOOC-2-AQ/AMWCNTs) which has been further employed for the development of highly sensitive oxygen sensor. The prepared composite has been characterized by TEM and electrochemical studies.

21. *Polyaniline/polyacrylic acid/multi-walled carbon nanotube modified electrodes for sensing ascorbic acid*

I. Tiwari, K. P. Singh, **Manorama Singh**, C. E. Banks

Anal. Methods, 2012, *4*, 118-124. **[Impact Factor: 2.073]**



A multi-walled carbon nanotube composite electrode incorporating Polyaniline (PANI) and Polyacrylic acid (PAA) is presented by diffusing aniline and PAA into Nafion-MWCNTs membranes supported upon a platinum macro disc electrode. Nafion is found to be an ideal medium for dispersion of MWCNTs and for the formation of a homogeneous composite. The composite has been characterized utilizing SEM, TEM, FT-IR and electrochemical techniques.

22. *Preparation and characterization of methylene blue- SDS-multiwalled carbon nanotubes nanocomposite for the detection of hydrogen peroxide*

I. Tiwari, **Manorama Singh**

***Microchimica Acta,* 2011,** *174*, 223-*230* **[Impact Factor: 5.705]**

A nanocomposite was prepared by physical adsorption of(cationic) methylene blue (MB) on (anionic) sodium dodecyl sulfate (SDS) that was wrapped on multiwalled carbon nanotubes (MWCNTs) on the surface of a glassy carbon electrode.

23. *Amperometric biosensor for nanomolar detection of hydrogen peroxide based on encapsulation of thymol blue-ormosil*

composite

I. Tiwari, **Manorama Singh**

***Sensor Letters*, 2011**, *9*, 1323-1330 **[Impact Factor: 1.28]**

An amperometric biosensor based on horseradish peroxidase and thymol blue-organically modified sol–gel glass composite has been fabricated for the determination of H_2O_2. We are for the first-time reporting electrochemistry of thymol blue encapsulated within organically modified sol–gel glass. The biosensor has been characterized by electrochemical and amperometric measurements. The biosensor shows fast response with minimum interference.

24. *A novel amperometric hydrogen peroxide biosensor based on Horseradish Peroxidase incorporated in organically modified sol-gel glass matrix /graphite paste with multiwalled carbon nanotubes*

Ida Tiwari, K.P.Singh, **Manorama Singh**

***Analytical Letters,* 2010**, *43*, 2010-2030**. [Impact Factor: 1.20]**

We herein report an electrochemical hydrogen peroxide sensor based on horseradish peroxidase immobilized in organically modified sol-gel glass (ormosil) with mediator ferricyanide along with multiwalled carbon nanotubes (MWCNTs). The ormosil material is converted to fine powder followed by incorporation within graphite paste electrode. The electrochemistry of redox materials encapsulated within ormosil has been studied. The requirement of MWCNTs is examined.

25. *An insight review on the application of polymer-carbon nanotubes based composite materials in sensor technology*

I. Tiwari, K. P. Singh, **Manorama Singh**

***Russian Journal of General Chemistry*, 2009**, *79*, 2685-269 **[Impact Factor: 0.658]**

Carbon nanotubes (CNT) polymer composites have shown potential applications for sensor/biosensor fabrication. Methods for preparation, characteristics are highlighted and future aspects are explored. Various analytes and polymeric materials have been cited to prove the importance of polymer/CNT composite systems in sensor technology.

Research Interest:

Preparation of nanocomposites and their applications in electrochemical sensors/biosensors, Electrocatalysis, Carbon (CNT & graphene) based nanocomposites, Metal nanoparticles, Photocatalysis.

Book Chapters:

1. *Graphene: a unique constructional material for electroanalytical applications*
   Ida Tiwari, **Manorama Singh** in book "***Sensors, transducers, signal conditioning and wireless sensors network" 2016*** Advances in Sensors series: Reviews, vol. *3*, ISBN No. 978 -84-608-7705-9.

2. *Advances in Sensors' Nanotechnology*
   Ida Tiwari, **Manorama Singh** in book entitled "***Advanced Sensor and Detection Materials***" **2014**, [DOI: 10.1002/9781118774038.ch1] [ISBN No: 978-1-118-77348-2,] Chapter – 1, Editor: Ashutosh Tiwari and Mustafa M. Demir, (WILEY-Scrivener Publishing, USA).

3. Polyaniline *Based Advanced Nanomaterials for the Sensor Applications*.
   Ida Tiwari, **Manorama Singh** in book entitled "***Nanotechnology in Polymers***'' **2011**, Chapter- 4, Editors: Amar Singh Singha and Vijay Kumar Thakur, (Studium Press LLC, Houston, Texas, USA.).

Conference Proceedings:

1. *Modification of anthraquinone-2-carboxylic acid with multiwalled carbon nanotubes and electrocatalytic behavior of prepared nanocomposite towards oxygen reduction*, Ida Tiwari, **Manorama Singh**, Mandakini Gupta in *International conference on "Chemistry for Sustainable Development"*, **Mauritius**, *Springer Link Groups,* **2012**, *p. 399.*

2. *Screen Printed Electrodes a Tool for Advances in Sensors' Field for Monitoring Analytes of Environmental Relevance*, Ida Tiwari, Monali Singh, **Manorama Singh**, *Advances in Applied Physical and Chemical Sciences-A Sustainable Approach*– **2014**, ISBN: 978-93-83083-72-5.

3. *Electrochemical hydrogen peroxide biosensor based on Safranine O/PVA modified GC electrode*, **Manorama Singh**, Ida Tiwari, "*4th ISEAC International Discussion meet on electrochemistry and its applications*" Feb 7-10, **2011**, Tiruvanantpuram, Kerala, India.

Workshop Attended:

1. *National Symposium–cum-Workshop on X-Ray Crystallography*, March 8-9, **2009**, Department of Chemistry, **Banaras Hindu University**, Varanasi-221005.

2. *National Workshop on Electroanalytical Techniques*, Oct 11-13, **2010**, **Algappa University**, Karaikudi, Tamilnadu-630003.

3. *National workshop on "Recent Advances in Micro-Electro-Mechanical systems, RAMEMS-2011*, March 7-9, **2011**, MEMS Design Centre (Under NPMASS), *Institute of Technology*, **Banaras Hindu University**, Varanasi-221005.

Paper Presented in Seminar/Conference:

1. National symposium on ''*Current Trends in Chemistry*'' **March 24-25, 2007**, Department of Chemistry, BHU, **Varanasi**-221005.

2. *10th CRSI National Symposium in Chemistry*, **Feb 1-3, 2008**, Indian Institute of Science (IISC), **Bangalore**.

3. International Conference on ''*Recent trends in sensor-development for the Assessment and Management of the Environment*'' **Jan 8-10, 2009**, Loyolla Institute of Frontier Energy (LIFE) Loyolla College, **Chennai**, Tanilnadu-600034.

4. National Seminar on ''*Recent Advances in Analytical Sciences-Indian Perspective*'' (RAASI), **Jan 20-21, 2011**, Indian Society of Analytical Scientists, Hyderabad Chapter & Indian Institute of Chemical Technology (IICT), **Hyderabad [*Received Best Oral Presentation Award*].**

5. 4th International Conference on ''*Recent trends in instrumental methods of analysis*'' **Feb 18-20, 2011**, Department of Chemistry, IIT Roorkee, **Roorkee**-247667.

6. National Seminar on "*Recent Trends in Chemical Research: Challenges Ahead*", **March 30-31, 2012**, Department of Chemistry, GGV, **Bilaspur**, (C.G.) – 495009.

7. National seminar on "*Chemistry in Our Lives*", **Feb 1-2, 2013**, Department of Chemistry, Govt. R.R. College, Bilaspur (C.G.)-495009.

8. International conference "*Indo-US workshop on electro analytical materials for fuel and biofuel cells*" Feb 26-28' 2013, Department of Chemistry, **BHU, Varanasi**-221005.

9. National Seminar on *"Advances in synthesis and characterization of materials for technological applications"* March 30th, 2015, Department of Pure and Applied Physics, GGV, Bilaspur, (C.G.)-495009.

10. *103rd Indian Science Congress*, University of Mysore, **Jan 3-7, 2016**, **Mysore**, Karnataka.

11. International conference on "*Recent advances in analytical sciences*" April 7-9, 2016, Department of Chemistry and IIT, BHU in association with ISAS, **BHU, Varanasi**-221005