



Dr. Tarun Kanti Sarkar

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RESEARCH INTERESTS

- Development of eco-friendly technologies for corrosion mitigation.
- Synthetic organic/polymer/materials chemistry.

EDUCATION

Degree and Institution	Percentage	Year
INDIAN INSTITUTE OF TECHNOLOGY (ISM), DHANBAD Doctor of Philosophy (Ph.D.)		2016
INDIAN SCHOOL OF MINES, DHANBAD Master of Science (M.Sc.) in Chemistry	74.60	2013
UNIVERSITY OF CALCUTTA Bachelor of Science (B.Sc.) with Chemistry Honours	60.50	2011
BISHNUPUR SIKHSHA SANGHA, WEST BENGAL (INDIA) Higher Secondary	70.42	2008
BRATACHARIGRAM BRATACHARI VIDYASHRAM, WEST BENGAL (INDIA) Secondary	70.50	2006

SCIENTIFIC AREA

- Corrosion Science and engineering
- Nano-structured Organic Materials
- Nano Composites
- Electrochemistry and Electrochemical analysis
- Materials Chemistry
- Surface characterization and adsorption
- Organic Synthesis and Characterization
- Green Chemistry
- Theoretical Chemistry
- Chromatography and Spectroscopy

RESEARCH EXPERIENCE

POST-DOCTORAL RESEARCH

August '17 – September '19

Project title: Development of green corrosion inhibitors for mineral lube.

Institution: CSIR-Indian Institute of Petroleum, Dehradun, India.

Supervisor: Dr. O. P. Khatri.

Fellowship Scheme: SERB-NPDF, INDIA

Targets accomplished:

- Carbohydrate derived green additives as corrosion inhibitors for mineral lube.
- Study of micro bacterially controlled corrosion of mild steel and its prevention green coatings.
- Synthesis and application of Graphene-MoS₂-Organic hybrid material for boosting the performance of commercial lubricant.
- Application of Polystyrene-GO nano composite for preparation of mechano-adaptive surface.
- Application of Graphene Oxide- organic hybrid as green additive for cutting fluids.

Ph.D. RESEARCH

August '13 – March '17

Project Title: Experimental and quantum studies on corrosion mitigation of petroleum oil well steel using organic inhibitors.

Institution: Indian Institute of Technology (ISM), Dhanbad.

Supervisor: Dr. M. Yadav.

Targets accomplished:

- Synthesis and application of eco-friendly carbohydrate and amino acid-based molecules as corrosion inhibitors for petroleum oil well steel in 15% HCl.
- Gravimetric and electrochemical analysis of corrosion
- Theoretical justification of corrosion inhibition capabilities of the synthesized inhibitors.

M.SC. PROJECT

July '11 – March '13

Project Title: Development of organic corrosion inhibitors for oilfield steel.

Institution: Indian School of Mines, Dhanbad.

Targets accomplished:

- Synthesis of diazepine for corrosion inhibition of steel in HCl.
- Gravimetric and electrochemical analysis of corrosion.

SUPERVISING EXPERIENCE

4 Master's thesis co-supervision during Ph.D tenure.

CURRENT STATUS

Working as "Science & Engineering Research Board (SERB)-National Post-Doctoral Fellow" at CSIR-Indian Institute of Petroleum, Dehradun, India from August-2017.

INSTRUMENTATION PROFICIENCY

FT-IR, UV-Vis Spectroscopy, HPLC, GC-MS, Nano Tribo Meter, Goniometer.

COMPUTER SKILLS

Operating System: Windows, Mac OS X & Linux (Debian based).

Software: MS Office, Gaussian 09, OriginPro, Libreoffice, GraphPad Prism, PerkinElmer Chemdraw, Gwyddion, Python 3

EXTRACURRICULAR ACTIVITIES

- Team in-charge, finance committee at 2nd National Symposium on "Shaping the Energy Future: Challenges and opportunities, SEFCO-2018" organized at CSIR-Indian Institute of Petroleum, Dehradun, India.
- Member of the management committee of "IIP-Students' Night Canteen" at CSIR-Indian Institute of Petroleum, Dehradun, India.
- Student President of 'Oitijhya', a student's cultural community at IIT (ISM), Dhanbad.

PERSONAL DETAILS

- Date of Birth: 28th January, 1991
- Nationality: Indian
- Sex: Male
- Address: Dasoakhanpara Udayrampur, South 24 Parganas, West Bengal-743398, India.

PUBLICATIONS**INTERNATIONAL JOURNAL PUBLICATIONS**

1. Mechano-adaptive thin film of graphene-based polymeric nanocomposite for enhancement of lubrication properties.
Ajay Chouhan, **Tarun K. Sarkar**, Sangita Kumari, K.L.N. Sivakumar, H. Sugimura, Om P. Khatri
Applied Surface Science, 2/2021; 538(148041)
2. Mitigation of corrosion in petroleum oil well/tubing steel using pyrimidines as efficient corrosion inhibitor: Experimental and theoretical investigation.
Tarun Kanti Sarkar, Vandana Saraswat, Ranjeet Kumar Mitra, I. B. Obot, Mahendra Yadav
Materials Today Communications, 11/2020;
<https://doi.org/10.1016/j.mtcomm.2020.101862>
3. Graphene-Based Aqueous Lubricants: Dispersion Stability to the Enhancement of Tribological Properties.
Ajay Chouhan, Sangita Kumari, **Tarun K. Sarkar**, Sooraj S. Rawat, Om P. Khatri.
ACS Applied Materials and Interfaces, 11/2020; 12 (51785–51796).
4. Synergistic lubrication performance by incommensurately stacked ZnO-decorated reduced graphene oxide/MoS₂ heterostructure.
Ajay Chouhan, **Tarun K. Sarkar**, Sangita Kumari, Srikanth Vemuluri, Om P. Khatri
Journal of Colloid and Interface Science, 07/2020, 580(730–739)
5. Adipates of poly(propylene oxide-co-tetrahydrofuran) as a novel base stock for varied lube applications.
Aruna Kukrety, **Tarun K. Sarkar**, Ekta Faujdar, Raj K. Singh, Suman L. Jain, Siddharth S. Ray.
Polymer Bulletin 10/2019, 76 (10), 5415-5431.
6. Biofilm development of *Bacillus thuringiensis* on MWCNT Bucky paper: Adsorption-synergic biodegradation of phenanthrene.
Abhrajyoti Tarafdar, **Tarun Kanti Sarkar**, Sourav Chakraborty, Alok Sinha, R E Masto.
Ecotoxicology and Environmental Safety, 08/2018; 157(327-334).
7. Carbohydrate compounds as green corrosion inhibitor: Electrochemical, XPS, DFT and molecular dynamics simulation studies.
M Yadav, **Tarun Kanti Sarkar**, Ime B Obot.
RSC Advances 01/2016; 6(110053).
8. Amino acid compounds as eco-friendly corrosion inhibitor for N80 steel in HCl solution: Electrochemical and theoretical approaches.

M Yadav, **Tarun Kanti Sarkar**, Taniya Purkait.
Journal of Molecular Liquids 12/2015; 212(731).

9. Adsorption and corrosion inhibitive properties of synthesized hydrazine compounds on N80 steel/hydrochloric acid interface: Electrochemical and DFT studies.

M Yadav, Dipti Sharma, **Tarun Kanti Sarkar**.
Journal of Molecular Liquids 12/2015; 212(451).

10. Application of new isonicotinamides as a corrosion inhibitor on mild steel in acidic medium: Electrochemical, SEM, EDX, AFM and DFT investigations.

M Yadav, R R Sinha, Tarun **Kanti Sarkar**, I Bahadur, E E Ebenso.
Journal of Molecular Liquids 12/2015; 212(686).

11. Studies on Adsorption and Corrosion Inhibitive Properties of Indoline Compounds on N80 Steel in Hydrochloric Acid.

M Yadav, **Tarun Kanti Sarkar**, Taniya Purkait.
Journal of Materials Engineering and Performance 10/2015; 24(4975).

12. Corrosion inhibition effect of spiropyrimidinethiones on mild steel in 15% HCl solution: Insight from electrochemical and quantum studies.

M Yadav, R R Sinha, Sumit Kumar, **Tarun Kanti Sarkar**.
RSC Advances 08/2015; 5(70832).

13. Synthesized amino acid compounds as eco-friendly corrosion inhibitors for mild steel in hydrochloric acid solution: Electrochemical and quantum studies.

M Yadav, Laldeep Gope, **Tarun Kanti Sarkar**
Research on Chemical Intermediates 07/2015; 42(2641).

14. Corrosion inhibition effect of pyrazole derivatives on mild steel in hydrochloric acid solution.

M Yadav, Rajesh Ranjan Sinha, **Tarun Kanti Sarkar**, Nidhi Tiwari
Journal of Adhesion Science and Technology 05/2015; 29(1690).

CONFERENCE PROCEEDINGS

15. Application of eco-friendly osazone compounds as corrosion inhibitors for oil field steel.

Tarun Kanti Sarkar, M Yadav.
IC3MTA 2016, Shillong, India.

16. Electro chemical & quantum chemical study for the corrosion inhibitive effects of less toxic pyrazole derivatives on N80 steel in 15% HCl.

Tarun Kanti Sarkar, Sumit Kumar, M Yadav.
ICC-2014, ISM-Dhanbad, India.

17. Electrochemical and Quantum Chemical Studies on Corrosion Inhibition of Imidazole Derivative on N80 Steel in 15% HCl Solution.

M Yadav, **Tarun Kanti Sarkar**, R R Sinha, P N Yadav
CORCON 2014, Mumbai, India.

18. Corrosion Inhibition and Adsorption behaviour of Benzothiazol on N80 Steel in Hydrochloric Acid: Experimental and theoretical studies.

Dipti Sharma, Sumit Kumar, **Tarun Kanti Sarkar**, M Yadav.
International Conference on Structural and Functional Properties of Solids (SPPS-2103), Dhanbad, India.

19. Electro analytical and Theoretical investigations of the corrosion Inhibition Behaviour of Benzimidazole on N80 steel in 15% HCl.

Tarun Kanti Sarkar, Sumit Kumar, Dipti Sharma, M Yadav.
International Conference on Structural and Functional Properties of Solids (SPPS - 2013), Dhanbad, India.

Date: 21.11.2020
Kolkata, India.

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REFEREES:

Name	Designation/ address	Contact Details
Dr. Anjan Ray	Director CSIR-Indian Institute of Petroleum, Dehradun, India, UTTARAKHAND- 248005.	Email. anjan.ray@iip.res.in Mobile No.: 9810208092
Prof. Mahendra Yadav	Prof. & HOD Dept. of Applied Chemistry Indian Institute of Technology (Indian School of Mines), Dhanbad, India, JHARKHAND- 826004	Email. mahendra@iitism.ac.in Mobile No.: 9431711185
Dr. Om Prakash Khatri	Principal Scientist CSIR-Indian Institute of Petroleum, Dehradun, India, UTTARAKHAND- 248005.	Email. opkhatri@iip.res.in Mobile No.: 9412050551