Joyee Mitra, Ph.D.

Present affiliation (Since January 2023):

Principal Scientist; Inorganic Materials & Catalysis Division,
CSIR-Central Salt & Marine Chemicals Research Institute,
Bhavnagar 364002, Gujarat, India
Phone: +91(0)278 2567760; Ext: 7200 (O); Mobile: +91(0)9956713222
E-mail: joyeemitra@csmcri.res.in; joyeemitra@gmail.com

Personal Details

Date of Birth: 31-12-1983
Familial Status: Single
Nationality: Indian

University education

Period	Name of the institution	Degree	Major subject studied/examined	Class obtained
08.2002 - 07.2005	Jadavpur University, Kolkata, India	B. Sc. (Hons.)	Chemistry (Hons.) Physics, Mathematics & Computer Programming [Subsidiary subjects]	First class [Chem. Hons. 73.5 %] [Subsidiary Subjects 80.8 %] [8th rank in University]
08.2005 - 09.2007	Jadavpur University, Kolkata, India	M.Sc.	Inorganic Chemistry	First-class [76.1 %] [Second Rank in the University]
07.2007 - 09.2012	Indian Institute of Technology Kanpur, India	Ph.D.	Chemistry	CGPA 9.67 (Course work)

Membership of Scientific Association

1. Materials Research Society of India (MRSI) – Life Member.
2. American Chemical Society (ACS) – Member.

Awards

1. DST-INSPIRE Faculty Award, DST India (February 2014)

Curriculum vitae: Dr. Joyee Mitra

Academic/Research Experience/Employment

Period	Name of employer	Position
11.2012 – 06.2014	Department of Chemistry, University of Illinois, Urbana-Champaign, USA with Prof. Thomas B. Rauchfuss	Post-Doctoral Associate
08.2014 – 01.2019	CSIR-CSMCRI Bhavnagar, Gujarat, India	DST-INSPIRE Faculty
01.2019 –01.2023	CSIR-CSMCRI Bhavnagar, Gujarat, India	Senior Scientist [Pay Level 12] Assistant Professor, AcSIR.
01.2023 – Present	CSIR-CSMCRI Bhavnagar, Gujarat, India	Principal Scientist [Pay Level 13] Associate Professor, AcSIR.

Research Interests

- Nanostructured functional materials for electrocatalytic water splitting, including seawater.
- Stimuli-responsive supramolecular gels and metal-free hydrogen-bonded systems.
- Recovery of critical metals from waste, including electronic waste.
- Heterogeneous catalytic approaches towards lignocellulosic biomass valorization.

Grant-in-Aid Projects handled as Principal Investigator

On-going Sponsored Projects
1. CSIR-FIRST Project [3nd Tranche, FIR030303]: Utilizing chiral-induced spin selectivity effect CISS in designing hydrogen-bonded organoelectrocatalysts for water splitting including seawater. Duration: 24 months, July 2024 – March 2026. Rs. 66.96 lakhs
2. SERB-POWER Grant (SPG/2021/004430): Functionalized s-Heptazine-containing Materials and their Applications in CO_2 Utilization. Duration: 36 months, July 2022-Oct 2025. Rs. 30.85 Lakhs.

Completed GAP Projects as a **Principal Investigator**
1. Tethered Metalloporphyrin-Molybdenum(dithiolene) Complexes Relevant to the Active Site of Molybdoenzymes, DST-INSPIRE Faculty Award; CRG/2020/000492; Duration 5 years, August 2014 to August 2019.

Projects handled as Co-Investigator

1. Extraction of Critical Metals from Used Lithium Ion Batteries (CSIR-MISSION Mode Project under CLP Theme, HCP 0028).

2. Electro- and photolysis of water for cost-effective production of pure H_2 utilizing renewable energy (CSIR-Focused Basic Research, MLP0063).
3. Greener process for the synthesis of 3-methyl-5-phenylpentanol (Mefrosol) at 1 Kg level with >90% yield and 98% purity (CSIR-FTT Project under CLP Theme MLP0032)

Institutional Responsibilities

- Instructor, **ACSIR-16-CS-AD-008** Functional Supramolecular chemistry (August Semester (s)).
- Member, AcSIR Academic Committee, CSIR-CSMCRI Bhavnagar (Aug 2025 onwards).
- Member, Standing Publications, Ethics and Scientific Vigilance Committee (SEC), CSIR-CSMCRI from 23.03.2021.

Major Outreach Activities

- Liaison: 1st ACS-DST Publishing Workshop at CSIR-CSMCRI Bhavnagar, in association with Vigyan Prasar on 15th November 2019. Coordinator from ACS: Dr. Deeksha Gupta
- Multiple visit to Kendriya Vidyalayas in Gujarat, as a part of Student-Scientist Interaction under Jigyasa Program.
- Discussing Chemical Research @ CSIR-CSMCRI with ~ 500 students at the Outreach Programme as a Prelude to IISF held at CSIR-CSMCRI on 10th November, 2016.
- Helped to organize RSC workshop for the students, in CSIR-CSMCRI (19th September 2016). Coordinator from RSC: Dr. Deeksha Gupta.

Ph. D. Thesis Supervision [Degree awarded 2 (Ongoing 4)]

Name of the candidate	Thesis title	Year	Co-supervisor	Current position of the candidate
Dr. Ekata Saha [DST-INSPIRE Fellow]	Triazole Based Small Molecule Metallo-Organogels and Their Applications	2016-2022	None	Post-doctoral Fellow, University of Gothenberg, Sweden.
Dr. Ashis Chhetri [CSIR Fellow]	Triazine-Based Materials: Design Strategy and Applications [PhD Degree awarded under AcSIR-RMIT Joint PhD program] RMIT Supervisor: Dr. Subashani Maniam	2019-2024	None	Post-doctoral Fellow at NIMS, Tsukuba, Japan.
Mr. Hiren Jungi [CSIR SRF Direct]	Utilization of spent lithium-ion batteries as a source of inorganic materials and exploring their applications	2021-Ongoing	None	
Ms. Asma A. Virani [DST-INSPIRE Fellow]	Valorization and Functionalization of Biomass and It's Applications	2023-Ongoing	None	

Ms. Sumana Podder [UGC Fellow]	Cyameluric Core Containing Systems: Design Aspects and Applications	2023-Ongoing	None	
Mr. Harpal G. Girase [UGC Fellow]	Exploration of Metal-Heptazines Systems in Catalysis	2025-Ongoing	None	
POST-DOCTORAL ASSOCIATES [COMPLETED 1 (PERMANENT EMPLOYMENT ACADEMIC)]				
Dr. Jijo Johnson	SERB-NPDF (PDF/2016/001642)	2017-2018	None	Asst. Professor, Santhom Malankara Arts and Science College, Kerala.

Annexure I

Total no of Publications (41) & Patent (1) **h Index: 15;** **Total No of Citation ~ 847 (Google Scholar);** **J. Mitra is Joyee Mitra**

List of Publications (Published peer-reviewed articles):				
Sl. No.	**Authors' Name**	**Publication Year**	**Title of the Article**	**Journal Name; Volume, Page No**
41	H. Jungi, S. Podder, D. Kumar, R. S. Malavika, R. Kuniyil, **J. Mitra**	2026	Experimental and Computational Study of Pyridine Carboxylate Ionic Liquid-Mediated Knoevenagel Condensation at Ultralow Loadings	**Asian J. Org. Chem.**, 15, e00635 DOI: 10.1002/ajoc.202500635
40	H. Jungi, A. Chhetri, D. Kumar, S. Podder, R. S. Malavika, R. Kuniyil, **J Mitra**	2026	Bifunctional picolinate ionic liquids as metal-/halide-free sustainable catalysts for CO_2 cycloaddition to epoxides	**Catal. Sci. Technol.**, 16, 458-468 DOI: 10.1039/D5CY01068C
39	A. Chhetri, S. Ahmad, S. Podder, S. Tothadi, S. Maniam, C. M. Reddy, **J. Mitra**	2026	Correlating Nanomechanical Behavior and Adsorption Performance in a Serendipitously Assembled Two-Dimensional Hydrogen-Bonded Organic System	**Langmuir**, 42, 609-618 DOI: 10.1021/acs.langmuir.5c04711
38	S. Podder, H. Jungi, **J. Mitra**	2025	In Pursuit of Carbon Neutrality: Progresses and Innovations in Sorbents for Direct Air Capture of CO_2	**Chem Eur. J.**, 31, e202500865 DOI: 10.1002/chem.202500865
37	N. Choudhary, H. Jungi, M. V. Gauswami, A. Kumari, A. B. Boricha, J. R. Chunawala, **J. Mitra**, A. R. Paital	2025	A closed-loop zero-liquid-discharge process for the precipitative separation of all valuable metals from waste lithium-ion batteries of mixed chemistries at room-temperature	**Green Chem.** 27, 4267-4279 DOI: 10.1039/D5GC00054H
36	S. Podder, R. Madhu, S. Kundu, **J. Mitra**	2025	Probing Under-Utilized Melem as Host Scaffold with Strategic Modulation of Cobalt Oxidation State to Accelerate Alkaline Water Splitting	**Small**, 21, 2501949 DOI: 10.1002/smll.202501949
35	H. Jungi, A. A. Virani, S. Podder, H. Girase, **J. Mitra.**	2024	Sustainable Combination of Waste with Waste: Utilization of Biomass to Recover Critical Metals from Spent Lithium ion Batteries (Hot Topic: Biomass Upgrading)	**Batter. Supercaps** e202400518 DOI: 10.1002/batt.202400518

34	E. Saha, A. Khan, A. I. Mallick, **J. Mitra**	2024	Purpose-built multicomponent supramolecular silver(I)-hydrogels as membrane-targeting broad-spectrum antibacterial agents against multidrug-resistant pathogens (Themed Collection: Bioinspired Functional Supramolecular Systems)	**J. Mater. Chem. B**, 12, 8767-8777 DOI: 10.1039/d4tb01355g
33	A. Chhetri, A. Maibam, S. Maniam, R. Babarao, K. Wilson, A. F. Lee, **J. Mitra**	2024	A Heterogeneous Acid-Base Organocatalyst For Cascade Deacetalisation-Knoevenagel Condensations.	**ChemSusChem.** 17, e202400866 DOI: 10.1002/cssc.202400866
32	A. Chhetri, A. Biswas, S. Podder, R. S. Dey, **J. Mitra**.	2024	Strategic design of VO_2 encased in N-doped carbon as an efficient electrocatalyst for the nitrogen reduction reaction in neutral and acidic media.	**Nanoscale.** 16, 9426-9435 DOI: 10.1039/D4NR00640B
31	E. Saha, H. Jungi, S. Dabas, A. Mathew, R. Kuniyil, S. Subramanian, **J. Mitra**	2023	Amine-rich Nickel(II)-Xerogel as a Highly Active Bifunctional Metallo-organo Catalyst for Aqueous Knoevenagel Condensation and Solvent-free CO2 Cycloaddition.	**Inorg. Chem.** 62, 14959-14970 DOI: 10.1021/acs.inorgchem.3c01669
30	E. Saha, A. Rahaman, S. Bhadra, **J. Mitra.**	2023	Exploring Amine-rich Supramolecular Silver(I)-Metallogels for Autonomous Self-healing and as Catalysts for Three Component Coupling Reaction.	**Dalton Trans.,** 52, 15530-15538 DOI: 10.1039/D3DT01654D
29	H. Jungi, A. Karmakar, S. Kundu, **J. Mitra**.	2023	Waste is the Best: End-of-Life Lithium Ion Battery-derived Ultra-active Ni^{3+}-Enriched β-$Ni(OH)_2$ for Electrocatalytic Oxygen Evolution Reaction.	**J. Mater. Chem. A**, 11, 13687-13696 DOI: 10.1039/D3TA01989F
28	A. Chhetri, K. Karthick, A. Karmakar, S. Kundu, **J. Mitra**	2023	Melamine-based Hydrogen-bonded Systems as Organoelectrocatalysts for Water Oxidation Reaction.	**ChemSusChem,** 16, e202300220 DOI: 10.1002/cssc.202300220
27	E. Saha, A. Chhetri, P. P. Venugopal, D. Chakraborty, **J. Mitra.**	2023	A chemically robust amine-grafted Zn(II)-based smart supramolecular gel as a regenerative platform for trace discrimination of nitro-antibiotics and assorted environmental toxins.	**J. Mater. Chem. C**, 11, 3252-3261 DOI: 10.1039/D2TC04700D
26	E. Saha, G. R. Bhadu, **J. Mitra**	2023	Ni(II) supramolecular gel-derived Ni(0) nanoclusters decorated with optimal N, O-doped graphitized carbon as bifunctional electrocatalysts for oxygen and hydrogen evolution reactions.	**Int. J. Hyd. Energy,** 48, 8115-8126 DOI: 10.1016/j.ijhydene.2022.11.256

25	S. Gundekari, M. Mani, **J. Mitra**, S. Kannan	2022	Selective Preparation of Renewable Ketals from biomass-based carbonyl compounds with polyols using β-zeolite catalyst.	**Mol. Catal**. 524, 112269. DOI: 10.1016/j.mcat.2022.112269
24	E. Saha, K. Karthick, S. Kundu, **J. Mitra**	2021	Regulating the heteroatom doping in metallogel-derived Co@dual self-doped carbon onions to maximize electrocatalytic water splitting.	**J. Mater. Chem. A** 9, 26800-26809. DOI: 10.1039/D1TA06639K
23	J. Johnson, E. Saha, A. Chhetri, E. Suresh, **J. Mitra**	2021	Self-Assembled Melaminium Adipate Lamellae for Adsorptive Removal of Anionic Dyes from Wastewater	**ACS Appl. Polym. Mater** 3, 651-660 DOI: 10.1021/acsapm.0c00955
22	S. Gundekari, H. Desai, K. Ravi**, J. Mitra**, K. Srinivasan**.**	2020	*In situ* Generated Ru(0)-HRO@Na-β from Hydrous Ruthenium Oxide HRO/Na-β: An Energy Efficient Catalyst for Selective Hydrogenation of Sugars	**Front. Chem. 8, 525277** DOI: 10.3389/fchem.2020.525277
21	E. Saha, K. Karthick, S. Kundu, **J. Mitra**	2019	Electrocatalytic Oxygen Evolution in Acidic and Alkaline Media by a Multistimuli-Responsive Cobalt(II)Organogel	**ACS Sustainable Chem Engg.** 7, 16094-16102 DOI: 10.1021/acssuschemeng.9b02858
20	E. Saha, **J. Mitra**	2019	Multistimuli-Responsive Self-Healable and Moldable Nickel(II)Based Gels for Reversible Gas Adsorption and Palladium Sequestration via Gel-to-Gel Transformation	**ACS Appl. Mater. Interfaces 11, 10718-10728** DOI: 10.1021/acsami.8b21606
19	**J. Mitra**, M. Saxena, N. Paul, E. Saha, R. Sarkar, S. Sarkar	2018	Visible light induced degradation of pollutant dyes using a self-assembled graphene oxide– molybdenum oxo-bis (dithiolene) composite,	**New J. Chem. 42, 14229-14238** DOI: 10.1039/C8NJ01899E
18	E. Palmajumder, S. R. Dash, **J. Mitra**, K. K. Mukherjea	2018	Multifunctional Biomimicking Oxidovanadium (V) Complex: Synthesis, DFT Calculations, Bromo - peroxidation and DNA Nuclease Activities	**ChemistrySelect 3, 7429-7438**; DOI: 10.1002/slct.201800817
17	M. R. Carlson, R. Gilbert-Wilson, D. R. Gray, **J. Mitra**, T. B. Rauchfuss, C. P. Richers	2017	Diiron Dithiolate Hydrides Complemented with Proton-Responsive Phosphine–Amine Ligands	**Eur. J. Inorg. Chem.** 3169-3173 DOI: 10.1002/ejic.201700474

16	M. Carlson, T Chapp, R Gilbert-Wilson, **J. Mitra**, T. B. Rauchfuss	2017	Diiron complexes with new proton-relay ligand platforms.	**Abstracts of Papers of the American Chemical Society**, Vol 254, 1155.
15	S. Naskar, E. Palmajumder, S. Patra, **J. Mitra**, K. K. Mukherjea	2017	Biomimicking Oxidative Bromination and DNA Nuclease Activities of a New Structurally Characterised Oxido-Diperoxidomolybdenum(VI)Complex.	**ChemistrySelect**, 2, 10199–10205. DOI: 10.1002/slct.201701807
14	J. Mitra, S. Sarkar	2016	Substrate Induced Morphology in a Hydrosulfide-Molybdenum Complex.	**New J. Chem**. 40, 8905-8910. DOI: 10.1039/C6NJ01910B
13	**J. Mitra**, S. Sarkar	2016	Photoinduced Electron Transfer from Oxo-Mo^{IV}Selenolato Complex to Oxygen.	**New J. Chem.** 40, 626-633. DOI: 10.1039/C5NJ02494C
12	**J. Mitra**, X. Zhou, T. B. Rauchfuss	2015	Pd/C-Catalyzed Reactions of HMF: Decarbonylation, Hydrogenation, and Hydrogenolysis. (Themed collection: 2015 most accessed Green Chemistry articles)	**Green Chem.** 17, 307-313. DOI: 10.1039/C4GC01520G
11	R. Kumar, S. Obrai, A. Kaur, M. S. Hundal, **J. Mitra**, S. Sharma	2015	Synthesis, crystal structure, computational, antimicrobial and in vitro anticancer studies of copper(II) 3,5-dinitrobenzoate complexes with N,N,N,N-tetrakis(2-hydroxyethyl) ethylenediamine and tris(2-hydroxyethyl)amine.	**J. Coord. Chem**. 68, 2130-2146. DOI: 10.1080/00958972.2015.1031120
10	R. Kumar, S. Obrai, A. Sharma, A. Kaur Jassal, M. S. Hundal, **J. Mitra**	2014	Synthesis, structural, spectral characterization, DFT analysis and antimicrobial studies of aquabis(L-ornithine)copper(II) picrate.	**J. Mol. Struct**. 1075, 43-48. DOI: 10.1016/j.molstruc.2014.06.061
9	S. Ghosh, S. S. Paul, **J. Mitra**, K. K. Mukherjea	2014	Rhenium(II) nitrosyl complexes: synthesis, characterization, DFT calculations and DNA nuclease activity,	**J. Coord. Chem**. 67, 1809-1834. DOI: 10.1080/00958972.2014.924622
8	X. Zhou, **J. Mitra**, T. B. Rauchfuss	2014	New Pathway for Catalytic C-O Bond Cleavage in Lignin Model Compounds.	**ChemSusChem**, 7, 1623-1626. DOI: 10.1002/cssc.201301253
7	G. Chambers, **J. Mitra**, T. B. Rauchfuss, M. Stein	2014	Ni(I)-Ru(II) Model for the Ni-L State of the [NiFe]-Hydrogenases: Synthesis, EPR Spectroscopy, H_2 Activation.	**Inorg. Chem.** 53, 4243-4249. DOI: 10.1021/ic500389p

6	**J. Mitra**, K. Pal, S. Sarkar	2013	Second Order Non-linear Optical Activity of Arsenic and Antimony Dithiolene Complexes.	**Dalton Trans.** 42, 13905-13911. DOI: 10.1039/C3DT51585K
5	R. Kumar, S. Obrai, **J. Mitra**, A. Sharma	2013	DFT studies of structural and some spectral parameters of copper(II) complexes with N,N,N,N" tetrakis(2-hydroxyethyl/ propyl) ethylenediamine and tris(2-hydroxyethyl)amine.	**Spectrochim. Acta Part A,** 115, 244-249. DOI: 10.1016/j.saa.2013.06.021
4	**J. Mitra**, S. Sarkar	2013	Oxo-Mo(IV)(dithiolene)(thiolato) Complex as Analogue of Reduced Sulfite Oxidase,	**Inorg. Chem.** 52, 3032-3042. DOI: 10.1021/ic302485c
3	**J. Mitra**, S. Sarkar	2013	Modelling the reduced xanthine oxidase in active sulfo and inactive desulfo forms,	**Dalton Trans,** 42, 3050-3058. DOI: 10.1039/C2DT32309E
2	**J. Mitra**, S. Sarkar	2011	Hydrosulfido Molybdenum(V) Complexes in Relevance to Xanthine Oxidase (Invited article, Special Issue on Bioinorganic Chemistry).	**Indian J. Chem Sec A,** 50A, 401-408. DOI:
1	A. Majumdar, **J. Mitra**, K. Pal, S. Sarkar	2008	Mono-oxo Bis(dithiolene) Mo(IV) / W(IV) Complexes as Building Blocks for Sulfide Bridged Bi and Tri-Nuclear Complexes	**Inorg. Chem.** 47, 5360-5364 DOI: 10.1021/ic800466x

Book Chapter

Sl No	Title of the Chapter	Publisher	Title of the Book	Year/ Page	Names of Authors
1	EXPLORING THE POTENTIAL OF METAL OXIDES FOR BIOMEDICAL APPLICATIONS	ELSEVIER	Metal oxides for biomedical and biosensor applications	2022, 183-203	J. Mitra, **J. Mitra**. DOI: 10.1016/B978-0-12-823033-6.00006-5
2	LEVULINIC ACID-AND FURAN-BASED MULTIFUNCTIONAL MATERIALS: OPPORTUNITIES AND CHALLENGES	SPRINGER INTERNATIONAL PUBLISHING	Catalysis for Clean Energy and Environmental Sustainability: Biomass Conversion and Green Chemistry-Volume 1	2021, 291-343	S. Gundekari, R. Kalusulingam, B. Dakhara, M. Mani, **J. Mitra**, K. Srinivasan. DOI: 10.1007/978-3-030-65017-9_11
3	PREPARATION OF CYCLOHEXANOL INTERMEDIATES FROM LIGNIN	ELSEVIER	Biomass, Biofuels, Biochemicals: Lignin	2021, 57-82	S. Gundekari, **J. Mitra**, T. Bhaskar, K. Srinivasan DOI: 10.1016/B978-0-12-820294-4.00004-1

	THROUGH CATALYTIC INTERVENTION		Biorefinery		

List of Patents (1):

Sl No	Title	Country	Filed on (Date)	Granted (Date)	Names of inventors
1	A ZERO-DISCHARGE HYDROMETALLURGY-BASED PROCESS FOR THE RECOVERY OF VALUABLE METALS FROM SPENT LITHIUM ION BATTERIES.	INDIA	No. 202111052187 Filed on 12 Nov 2021.	Publication date 12-05-2023	ALOK RANJAN PAITAL, ARVIND KUMAR BALVANTRAI BORICHA, **JOYEE MITRA**, JATIN RAMESHCHANDRA CHUNAWALA, MAULIK VINODPURI GAUSWAMI, ANU KUMARI, HIREN DEVJI JUNGI, NISHU CHOUDHARY