BIODATA of Siddhartha Sengupta

1. **Name and Full Correspondence Address:** Siddhartha Sengupta
2. **Email(s) and Contact number(s):** siddhartha@iitism.ac.in, 9471192418
3. **Institution:** IIT(ISM) Dhanbad, Jharkhand 826004
4. **Date of Birth:** 21 January 1984
5. **Gender:** Male
6. **Category:** General
7. **Whether differently able:** No
8. **Academic Qualifications:**

Sl. No.	Degree	Year	Subject	University/Institution
1	B. TECH	2006	Chemical Engineering	Heritage Institute of Technology, West Bengal University of Technology, Kolkata
2	ME	2008	Chemical Engineering	Jadavpur University, Kolkata
3	PhD	2015	Chemical Engineering	Indian Institute of Technology Kanpur, Kanpur

9. **Ph.D. thesis title, Institute/Organization/University, Year of Award.**

Dissertation Title: CO_2 reforming of CH_4 over unmodified and modified Ni/Al_2O_3 catalysts
Institute: Indian Institute of Technology Kanpur
Year of Award: 2015

10. **Work Experience:**

S.No.	Positions held	Name of the Institute	From	To
01	Assistant Professor	IIT(ISM) Dhanbad	July 2014	April 2022
02	Associate Professor	IIT(ISM) Dhanbad	April 2022	Till date

Specialization and Expertise: Research in our group is resting on understanding the catalytic activity and selectivity issues for supported metal and metal oxide and related heterogeneous catalysed systems. Our current research interest is in the broad area of heterogeneously catalysed reactions involving hydrocarbons for which the effects of various catalyst parameters were studied. A judicious choice of characterization techniques complimented with reactivity data assists in the understanding why some of the parameters do or do not have an effect on the catalytic activity and selectivity. Designing a catalyst using modifiers has also been undertaken and from the structure-reactivity relationships and statistical methodologies, an optimum catalytic composition was determined. Specifically, the reactions that are under consideration: (i) Dry Reforming of Methane to produce syngas and (ii) CO_2 hydrogenation for the production of Methanol and Methane. Future studies will involve other hydrocarbon-based reactions and the utilization of simultaneous *in situ* characterization and reaction techniques, coined as *Operando* spectroscopy, for the understanding of some heterogeneously catalyzed reactions.

11. Professional Recognition/ Award/ Prize/ Certificate, Fellowship received by the applicant

Sl.No	Name of the Award	Awarding Agency	Year
01	-	-	-

12. A) Publications (List of Selected Papers Published in SCI Journals)

S. No.	Authors	Title	Name of the Journal	Vol.	Page	Year
01						
02	S C Nayak, S Sengupta, G Deo	*Effect of Contact Time on Carbon Deposition and Catalytic Activity of Nickel Alumina Catalysts for Dry Reforming of Methane*	*Chemistry Select*	9(27)	e202304841	2024
03	V.V.S.S.D. Manikanta, S Sengupta.	Ni-based Catalyst Development for the Catalytic Conversion of CO_2 to Substitute Natural Gas—Effect of Preparation Method	*Catalysis Letters*	-	-	2024
04	Pavan K. Gupta, Vineet Kumar, Sudip	*Comparative Studies of Co/SBA-15 Catalysts*	*Chemistry Select*	8 (11)	e202204962	2023

	Maity, Goutam Kishore Gupta, Sudipta Datta, Arvind Singh, **Siddhartha Sengupta**	*Synthesized with Different Silica Sources Including Coal Fly Ash for Fischer-Tropsch Synthesis*				
05	R Kumari, **S Sengupta**	*$MgAl_2O_4$ with CaO in supported Ni and Ni-Co catalysts - impact on CO_2 reforming of CH_4*	*Indian Chemical Engineer*	65(6)	574-586	2023
06	M D Shakir, M Prasad K Ray, **S Sengupta,** A Sinhamahapatra, S Liu, H Vuthaluru,	*$NaBH_4$-Assisted Synthesis of B−(Ni−Co)/$MgAl_2O_4$ Nanostructures for the Catalytic Dry Reforming of Methane*	*ACS Applied Nano Materials*	5	10951−10961	2022
07	M D Shakir, M Prasad K Ray, **S Sengupta**, A Sinhamahapatra, S Liu, H Vuthaluru,	*B-Ni/$MgAl_2O_4$ catalyzed dry reforming of methane: The role of boron to resist the formation of graphitic carbon*	*Fuel*	320	123950	2022
08	M Prasad, K Ray, A Sinhamahapatra, **S Sengupta;** 57 (2022)	*Ni/$Ce_xZr_{1-x}O_2$ catalyst prepared via one-step co-precipitation for CO_2 reforming of CH_4 to produce syngas: Role of oxygen storage capacity (OSC) and oxygen vacancy formation energy (OVFE)*	*Journal of Materials Science*	57	2839–2856	2022
09	S Biswas, H-Y Lee, M Prasad, A Sharma, J-S Yu, **S Sengupta**, D D Pathak, and A Sinhamahapatra	*Black TiO_{2-x} Nanoparticles Decorated with Ni Nanoparticles and Trace Amounts of Pt Nanoparticles for Photocatalytic Hydrogen Generation,*	*ACS Applied Nano Materials*	4	4441-4451	2021
10	R Kumari, **S Sengupta**	*Catalytic CO_2 reforming of CH_4 over $MgAl_2O_4$ supported Ni-Co catalysts for the syngas production,*	*International Journal of Hydrogen Energy*	45	22775 - 22787	2020
11	K Ray, **S Sengupta**, G Deo	*Reforming and cracking of CH_4 over Al_2O_3*	*Fuel Processing Technology*	156	195-203.	2017

		supported Ni, Ni-Fe and Ni-Co catalysts;				
12	**S Sengupta** and G Deo	*Modifying alumina with CaO or MgO in supported Ni and Ni-Co catalysts and its effect on dry reforming of CH_4*	*Journal of CO_2 Utilization*	10	67-77.	2015
13	G P Singh, A P Moon, **S Sengupta**, G Deo, S Sangal and K Mondal	*Corrosion Behavior of IF Steel in Various Media and Its Comparison with Mild Steel*;	*Journal of Materials Engineering and Performance*	24	1961-1974.	2015
14	**S Sengupta**, K Ray and G Deo	*The effects of modifying the Ni/Al_2O_3 catalyst with cobalt on the catalytic reforming of CH_4 with CO_2 and cracking of CH_4 reactions*;	*International Journal of Hydrogen Energy*	39	11462 - 11472	2014
15	Taraknath Das, **S Sengupta** and G Deo	*Effect of calcination temperature during the synthesis of Co/Al_2O_3 catalyst used for the hydrogenation of CO_2*	*Reaction Kinetics, Mechanisms and Catalysis*	110	147-162.	2013
16	A Choudhary, **S Sengupta**, C Bhattacharjee and S Datta	*Effects of co-solutes on Cr (VI) removal by micellar enhanced ultrafiltration (MEUF) process*;	*Desalination and Water Treatment*	44	67-74.	2012
17	S Mondai,, S Dasgupta., **S Sengupta**, C Bhattacharjee, S Mondai,	*A study based on the different dozing levels pf primary tanery wastewater treatement*	*Indian Journal of Environmental Protection*	30(1)	40–45	2010
18	A Choudhary, **S Sengupta**, C Bhattacharjee and S Datta,	*Extraction of Hexavalent Chromium from Aqueous Stream by Emulsion Liquid Membrane (ELM)*;	*Separation Science and Technology*	45	178-185.	2010

B) Selected Recent Conference Publications:

- S Kamaliney, **S Sengupta**, **Development of carbon resistant catalyst by exploiting the role of B and OSC for DRM,** 18 th International Congress on Catalysis, Lyon, France, 2024

- P Singh, **S Sengupta, Pd Promoted Mixed Metal Oxide Supported Catalyst for CO_2 Hydrogenation to Methanol,** 18 th International Congress on Catalysis, Lyon, France, 2024
- V.V.S.S.D. Manikanta, S , **CO_2 to Substitute Natural Gas by Pulse Reaction - Effect of Catalyst Preparation,** 18 th International Congress on Catalysis, Lyon, France, 2024
- P Singh, **S Sengupta**, Ceria Zirconia based Mixed Metal Oxide Catalyst Development for methanol production by CO_2 Hydrogenation, International Conference on Net-Zero Emission Technology for sustainable Development: Challenges and Opportunities (N0ET-2022), IIT(ISM) Dhnabad
- P Singh, **S Sengupta**, Screening of reducible oxide support for CO_2 Activation to methanol**,** International Conference on Chemical Engineering: Enabling Transition towards sustainable future-2022
- P Singh, **S Sengupta**, Catalyst Development for methanol production by CO2 Hydrogenation, Chemcon-2019
- M Prasad, **S Sengupta**, Dry Reforming of Methane for the Production of Syngas over Ceria-Zirconia Supported Nickel-based Catalysts, ACES-2020 IISER Bhopal
- M Prasad, **S Sengupta**, Thermodynamic Analysis of Dry Reforming of Methane for the Production of Syngas using Aspen Plus at Equilibrium Conditions, CHEMCON-2020
- Goutam Deo, Koustuv Ray, Aditya S. Sandupatla, **S Sengupta**, Sudhir C. Nayak, Puneet K. Chaudhary and Neeraj Koshta; Good Catalyst Better Catalyst for the CO_2 Reforming of CH_4: A Bit of Science and Engineering for this Catalytic Reaction, 26th meeting of the North American Catalysis Society (NAM26) 2019, Chicago, USA.
- R Kumari and **S Sengupta**, *Dry Reforming of Methane over Ni-based Catalysts*, Conference on Advances in Catalysis for Energy and Environment (CACEE-2018), organized by TIFR, Mumbai, 2018.
- G Saha and **S Sengupta**, *Catalytic CO_2 Hydrogenation to Methanol Production*, Conference on Advances in Catalysis for Energy and Environment (CACEE-2018), organized by TIFR, Mumbai, 2018.
- **S Sengupta** and G Deo**,** *CO_2 reforming of CH_4 over modified Ni/Al_2O_3 catalysts*, 12th International Conference on Carbon Dioxide Utilization (ICCDU XII), 2013 Alexandria, Virginia, United States.
- K Ray, **S Sengupta** and G Deo, *Catalytic activity of alumina supported Ni-based bimetallic catalysts*, 2nd International Conference on Materials for Energy ENMAT II, 2013, Karlsruhe, Germany.

- **S Sengupta** and G Deo**,** *CO_2 Reforming of CH_4 to Produce Syngas over Metal-Supported Catalysts*.15th International Congress on Catalysis 2012, 2012, Munich, Germany.
- **S Sengupta** and G Deo**,** *CO_2 Reforming of CH_4 to Produce Syngas over Metal-Supported Catalysts*. 2nd Indo-German Workshop on "Advances in Reaction and Separation Processes, 2012, Bad Herrenalb, Germany.
- **S Sengupta** and G Deo**,** *CO_2 reforming of CH_4 to produce synthesis gas over modified and un-modified Ni/Al_2O_3 catalysts.* ChEmference 2011, Chemical Engineering Department, IISc Bangalore, 2011, India.
- **S Sengupta** and G Deo**,** *CO_2 reforming of CH_4 to produce synthesis gas over modified and un-modified Ni/Al_2O_3 catalysts*. 11th International Conference on Carbondioxide Utilization (ICCDU XI), 2011, Dijon, France.

13. Any other relevant information:

A) **Sponsored R&D projects completed/handled:**

Sl. No.	PI/Co-PI/Member	Sponsoring Authority	Topic/ Field	Sanctioned Amount (Lakhs)	Status
1	Member	Shri Naresh Vashisht (Alumni)	Centre for Hydrogen and CCUS Technologies	1000	Ongoing (from 30 September 2024)
2	Co-PI	Ministry of Chemicals and Fertilizers, Department of Chemicals and Petrochemicals	Coal to Acetylene and Fine Chemicals	561	Sanctioned (23 September 2024)
3	Co-PI	DST (SERB)- FIST	To strengthen the research facilities in the Department of Chemical Engineering	156	Ongoing
4	Co-PI	DST (SERB)- SUPRA	Investigating Uncharted 2D Catalytic Materials for Lignocellulosic Biomass Transformation into High-Value Platform Chemicals and Fuel	30.25	Completed

5	PI	DST (SERB)	Development of an efficient Pd-Cu bimetallic catalyst for the catalytic CO_2 hydrogenation for Methanol production	22.15	Completed
6	PI	TEQIP-II	TEQIP-II under Minor Research Project Scheme, ISM Dhanbad	1.5	Completed
7	PI	Faculty Research Scheme (FRS), ISM Dhanbad	CO_2 reforming of CH_4 over modified Ni based catalysts for synthesis gas production	11.15	Completed

14. Experience

Details of expertise available and work done in the proposed field by the institution/ agency(s) concerned

Currently working as an Associate Professor in the Department of Chemical Engineering at the Indian Institute of Technology (Indian School of Mines) Dhanbad. Research in our group is resting on understanding the catalytic activity and selectivity issues for supported metal and metal oxide and related heterogeneous catalysed systems. The current research interest is in the broad area of heterogeneously catalysed reactions involving hydrocarbons for which the effects of various catalyst parameters are studied. A judicious choice of characterization techniques complemented with reactivity data assists in understanding why some of the parameters do or do not have an effect on the catalytic activity and selectivity. Designing a catalyst using modifiers has also been undertaken and from the structure-reactivity relationships and statistical methodologies, an optimum catalytic composition is determined. Specifically, the reactions that are under consideration: are (i) Dry Reforming of Methane (DRM) to produce syngas and (ii) CO_2 hydrogenation for the production of Methanol and Methane. Future studies will involve other hydrocarbon-based reactions and the utilization of simultaneous *in-situ* characterization and reaction techniques, coined as *Operando* spectroscopy, for the understanding of some heterogeneously catalysed reactions. I have completed a project under the Young Scientist Scheme (YSS) of SERB on the topic of CO_2 conversion to Methanol [File No: YSS/2015/001040]. I have worked on the topic of catalytic CO_2 conversion for more than 15 years and have considerable publications in reputed journals (list of publications is provided in bio data).