

Bio Data

1. Name: Dr. Chandra Sekhar Rout

2. Address: Professor, Centre for Nano & Material Sciences, Jain University,
Jakkasandra Post, Kanakapura Taluk, Ramanagara District- 562112,
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3. Gender: Male

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6. Qualification:

S. No.	Degree	Institution	Year	Division/Class
1	Ph.D.	JNCASR, Bangalore	2008	NA
2	M.Sc. (Physics)	Utkal University	2003	1 st class
3	B.Sc. (Physics)	Utkal University	2001	1 st class

Discipline: Physics (Applied Physics)

Area of specialization: Functional materials for energy storage, Supercapacitors, Microsupercapacitors, Flexible supercapacitors, 2D materials

Title of the PhD Thesis: Gas-sensing and electrical properties of metal oxide nanostructures

Thesis Supervisor: Professor C.N.R. Rao, FRS.

6. Employment Experience

S. No.	Position & Organization	Nature of Job	Period
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1.	Professor, University	Jain	Research, Teaching and other Academic work	May 2021 - continue
2.	Associate Professor, University	Jain	Research, Teaching and other Academic work	August 2017 –April 2021
3.	DST Ramanujan Fellow, IIT Bhubaneswar		Research, Teaching and other Academic work	Feb 2013 to July 2017
4.	Post-Doctoral Fellow, Ulsan National Institute of Science and Technology, SouthKorea		Research	Jan 2012 to Dec 2012
5.	Post-doctoral researcher at Purdue University, USA.		Research	Jan 2010 – Dec 2011
6.	Post-doctoral researcher at National University of Singapore		Research	Oct 2008 – Dec 2009

7. Publications:- 176 publications in International journals (+ > 25 papers are under review)

8. Patents filed/Granted with details: 02

9. Books Published: 04

(i) Fundamentals and sensing applications of 2D materials: Edited by **C.S.Rout**, Hywel Morgan and D.J. Late, 2019, *Elsevier (Woodhead publishing)*, ISBN: 9780081025789

(ii) Gas sensing and electrical properties of metal oxide nanostructures, **C.S. Rout**, *LAP Lambert Academic Publications*, Germany, 2010, 978- 3-8383-6358-5

(iii) Fundamentals and supercapacitor applications of 2D materials, Edited by

C.S. Rout and D.J. Late (Elsevier), 2021, **ISBN:** 9780128219935

(iv) **Metallic 2D Materials: Fundamentals and applications**, edited by B. Chakraborty and C.S. Rout (Nova publishers)

C.S. Rout is the group leader of the laboratory on Functional materials and devices in Centre for Nano and Material Science, Jain University. Since last decade he has been working on 2D materials synthesis, characterization and its application in energy storage devices, supercapacitors and microsupercapacitors, Field emitters, chemical-biosensors and other device applications (*Chem. Comm.*, 2017, 53, 228.; *Nanoscale* 2015, 7, 13293; *J. Mater. Chem. A*. 2015, 3, 18874; *Sci. Reports (Nature)*, 2013, 3, 3282; *J. Am. Chem. Soc.* 2013, 135, 8720) He has also expertise in variety of nanostructured thin films and advanced characterizations for optoelectronics and nanoelectronics devices. He is recipient of Ramanujan Fellowship, Young scientist and early career research awards of Department of Science and Technology, Government of India. He is the Associate Editor of the journal RSC Advances published by Royal Society of Chemistry, UK from 2015-present. He has authored or co-authored ~ 200 research papers in international journals. His current google scholar h-index is 44, i-10 index ~ 120 with total citations >9000.

10. Sponsored Research Projects

Title of the project	Funding Agency & Total cost	Lead coordinator and Duration	Significant outcomes
Two dimensional NiCo ₂ O ₄ -graphene composites for high performance supercapacitor electrodes	BRNS -DAE Rs. 24.46 Lakhs	Dr. C.S. Rout (2014-2017)	The supercapacitors fabricated using NiCo ₂ O ₄ showed specific capacitance of ~823 Fg ⁻¹ at a current density of 0.823 Ag ⁻¹

Flexible and free-standing vanadium sulfides/ reduced graphene oxide paper for high performance supercapacitor electrodes	DST Rs. 11.41 Lakhs	Dr. C.S. Rout (2014-2017)	VS4/reduced graphene oxide, which showed an enhanced specific capacitance of ~877 F/g at a current density of 0.5 A/g.
Chemical and Biosensors based on two dimensional layered structures and their graphene based hybrids	UGC-UKIER I Rs. 22.72 Lakhs	Dr. C.S. Rout (2014-2016)	We published a joint review article in “Nanoscale, 2015, 7, 13293-13312” on recent developments of 2D materials in various sensing applications like chemical and gas sensors, electrochemical sensors and biosensors, SERS sensors and photodetectors.
Resistive memory devices based on semiconductor nanostructures and graphene	SERB-DST Rs. 85.00 Lakhs	Dr. C.S. Rout (2014-2018)	Resistive memory devices and other electronic devices have been fabricated.
Heterojunction white light emitting diodes based on metal oxides and their graphene oxide based hybrids	SERB-DST Rs. 17.04 Lakhs	Dr. C.S. Rout (2014-2017)	Two-dimensional metal oxide nanosheets have been prepared by facile and cost-effective one-step electrodeposition method.
Center of Excellence for Novel Energy Materials	MHRD Rs. 300.00 Lakhs	Prof. Saroj KNayak (2014-2019)	Novel materials prepared exhibits a high specific capacitance of 2421 F/g at a current density of 1 A/g, and excellent cyclic performance, suggesting it an efficient electrode for next generation supercapacitors.

Joint centre on “Nanostructure Genomics: Designing Functionality of 2-Dimensional Nanostructures and Nano-Bio Interfaces”	IUSSTF Rs. 67.44 Lakhs	Prof. Saroj KNayak (2015-2018)	Biosensors based on 2D materials and graphene hybrids have been investigated.
High performance microsupercapacitors based on vertically standing NiCo ₂ S ₄ /graphene arrays with insight from Raman spectroscopy & DFT investigations	SERB-DST Rs. 43.00 Lakhs	Dr. C.S. Rout (2018-2021)	Vertically aligned NiCo ₂ S ₄ /graphene arrays are investigated for high performance supercapacitor applications
Defect engineering of 2D transition metal carbide-graphene heterostructures for high performance hybrid electronic devices	DST (India-Austria collaboration grant), Rs. 9.4 Lakhs	Dr. C.S. Rout (2019-2021)	2D transition metal carbide-graphene heterostructures for energy conversion and storage applications are investigated.
MXenes derived Two dimensional C-TiO ₂ -Ag nanocomposites for antimicrobial self-cleaning and conservation of heritage objects	DST, Rs. 50.0 Lakhs	Dr. C.S. Rout (2019-2022)	Ongoing project

Energy storage devices based on 2D MXene and layered transition metal chalcogenides hybrids	VGST, Govt. of Karnataka, Rs. 5.0 Lakhs	Dr. C.S. Rout (2019-2020)	Energy storage applications of various 2D layered materials and their MXene based hybrids are investigated.
Self-charged energy storage devices based on defect engineered advanced heterojunction materials	DST-Nanomission, Rs. 44.38 Lakhs	Dr. C.S. Rout (2019-2022)	Ongoing project

11. Teaching Experience:

S.N.	Subject taught	UG/ PG/ PhD	Year & Institution
1.	Physics-I: Oscillations, Waves and Electromagnetic waves	UG	I.I.T. Bhubaneswar, 2012-2017
2.	Quantum Mechanics I	UG	I.I.T. Bhubaneswar, 2012-2017
3.	Laboratory	UG	I.I.T. Bhubaneswar, 2012-2017
4.	Electronics	PG	I.I.T. Bhubaneswar, 2012-2017
5.	Laboratory	PG	I.I.T. Bhubaneswar, 2012-2017
6.	Quantum Mechanics	PG	CNMS, Jain University, 2017-cont
7.	Nuclear Physics	PG	CNMS, Jain University, 2017-cont
8.	Mathematical Methods	PG	CNMS, Jain University, 2017-cont
9.	Nanoscience & Nanotechnology	PhD	CNMS, Jain University, 2017-cont
10.	Device and Applied Physics	PhD	CNMS, Jain University, 2017-cont

11.	Spectroscopy I	PG	CNMS, Jain University, 2017-cont
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Teaching interests: Semiconductor Physics and Devices, Solid State Physics, Fundamentals of Nanoscience and Nanotechnology, Basics of Quantum mechanics, Experimental Methods in Materials Science and Engineering, Carbon based Materials and Devices, 2 Dimensional Materials and applications, Renewable energy sources and devices, Electronics

12. Thesis (Masters/PhD level) & Postdoc supervision

S.N	Name of the Student	Masters /PhD/ Postdoc	Title of Thesis/Research	Year
1.	Dr. Karthick Kannan P	Postdoc	Non-enzymatic Biosensors based on 2D materials	2014-2016
2.	Dr. Sanjay Mondal	Postdoc	Flexible Supercapacitor devices based on graphene analogue	2016
3.	Dr. Rajeswari P	Postdoc	Flexible Biosensor devices based on ZnO-graphene composites	2016-2018
4.	Dr. Mukulika Dinara	Postdoc	Supercapacitors based on 2D materials	2017-2019
5.	Mr. Kusha Kumar Naik	PhD	Multi-functional Nanosheet Arrays for field emission and biosensing applications	Complete (2013-2019)
6.	Mr. Satyajit Ratha	PhD	Supercapacitors based on 2D materials and hybrids	2015-Cont

7.	Mr. Surjit Sahoo	PhD- discontin ued	Flexible Supercapacitors based on spinel oxides and chalcogenides	2014- 2016
8.	Ms. Rutuparna Samal	PhD- cont.	Engineered functional materials for Supercapacitor applications	Thesis submitt ed
9.	Ms. Mansi Pathak	PhD- cont.	Ternary spinel based materials for supercapacitor applications	2018- cont
10.	Mr. Sree Raj	PhD- cont.	Metallic 2D materials for energy storage applications	2018- cont
11.	Mr. Suresh Kumar	MSc.	2D layered material for biosensing applications	2015
12.	Mr. Krishnakanta Singha	MSc.	3D mesoporous NiCo ₂ O ₄ for supercapacitor applications	2016
13.	Mr. Rajat Mondal	MSc.	NiMoO ₄ nanosheets: preparation, characterization and energy storage application	2016
14.	Mr. Alok Pathak	MSc.	Asymmetric supercapacitors	2017
15.	Ms. Manisha Sharma	MSc.	Glucose sensors based on MoO ₃ nanorods	2017
16.	Ms. Maneesha	MSc.	Spinel Oxides for non- enzymatic glucose sensors	2018
17.	Mr. Soumen Mondal	MSc.	Symmetric supercapacitor electrodes based on CVD grown metal sulfides	2018
18.	Mr. Jitendra Kapuria	MSc.	CVD growth of ternary transition metal sulphides for supercapacitor application	2019

19.	Ms. Dipti Tamang	MSc.	Transition metal selenides for supercapacitor electrodes	2019
20.	Ms. Minu Mathew	PhD- discontinued	MXene derived TiO ₂ based materials for photocatalysis	2019- cont
21.	Ms. Sithara R.	PhD	2D materials for photocatalysis and self cleaning applications	2019- cont
22.	Mr. Abhinandan Patra	PhD	2D materials for Energy storage device applications	2019- cont
23.	Mr. Aditya Sharma	PhD	Self-powered microsupercapacitors	2019- cont
24.	Mr. Namsheer K.	PhD	Conducting polymers and hybrid materials for supercapacitor applications	2019- cont
25.	Mr. Prateek Shinde	PhD	2D TMDs and its hybrids for energy storage and conversion	Thesis submitted
26.	Ms. Aswathy	PhD	2D materials and their hybrids for Energy conversion applications	2019- cont
27.	Ms. Mahima Bhat	MSc.	Hybrid multi-walled carbon nanotubes/Manganese diselenide cubes: Synthesis, characterization and comparative investigation of energy storage performance	2020

13. Awards and Honors:

S. No.	Name of the award	Awarding agency	Year
1.	Emerging Investigator award	Elsevier	2017
2.	IAAM medal 2017	International Association of Advanced Materials	2017
3.	Nanotechnology & J. Phys. D Outstanding Reviewers award	IOP Publishing, UK	2017
4.	Venus International Foundation (VIFFA) Young Researcher Award	VIFFA, India	2015
5.	ACS membership award in recognition of engagement with ACS's mission of service Life member	ACS publishers	2015-2018
6.	Life Membership	Carbon Society, India	2015
7.	Associate Editor, RSC Advances	RSC Publishers, UK	2015-cont
8.	American Journal of Engineering and Applied Sciences, Science Publications	Science Publications	2015-cont
9.	Associate (Guest Editor), Frontiers in Chem.	Frontiers	2019
10.	Life Membership	Materials Research Soc. Of India (MRSI)	2018-cont
11.	Top 2% Indian Researchers in 2019 – By Stanford Study	Stanford Study	2019 & 2020

14. Conferences organized

S.No.	Conference name	Date & Year
1.	“International conference on Frontiers in Materials (F2DM)” at CNMS-Jain University	March 13-16, 2019
2.	“International conference on Green methods for separation, purification and nanomaterials synthesis (GMSP & NS)” at CNMS-Jain University	April 24-25, 2018
3.	National seminar on “Frontiers in Materials & Chemical Sciences” at CNMS-Jain University	August 30-31, 2018

15. Invited Talks:

S.No.	Conference Name & Organizer	Date & Year
1.	5 th International conference on advances in energy research (ICAER 2015) organized by IIT Bombay	Dec 15-12, 2015
2.	International conference on multifunctional materials, organized by IITBHU	Oct 27-29, 2015
3.	National conference on Carbon materials, organized by Carbon Society of India, NPL-Delhi	Nov 26-28, 2015
4.	Nanotechnology: Present & Future aspects in Science & Engineering (NASE-16), organized by VSSUT-Burla	July 2-3, 2016
5.	One symposium on recent trends in Physics, organized by Dept. of Physics-Utkal University	Jan 03, 2015
6.	Winter school-2015, organized by JNCASR-Bangalore and University of Cambridge	Dec 02-06, 2013
7.	PSI, organized by Institute of Physics-Bhubaneswar, IACS-Kolkata & IIT Bhubaneswar	Feb. 22-26, 2014
8.	ICONSAT 2014, organized by INST Mohali	March 2-5, 2014
9.	4 th International symposium on energy challenges & Mechanics, Aberdeen-UK	Aug 11-13, 2015
10.	8 th international conference ICMAT 2015 & IUMRS-ICA 2015, Singapore	June 28-July 03, 2016

11.	International conference on perspectives in vibrational spectroscopy (ICOPVS 2016), organized by Lucknow University	November 05-08, 2016
12.	4 th international conference on nanostructured materials & composites (ICNM 2017), organized by MG University	February 10-12, 2017
13.	International conference on new scintillations on materials horizon (NSMH 2016), organized by MJP Pohilkhand University, Bareilly	October 21-23, 2016
14.	International conference on Nanoscience & Nanotechnology 2017, organized by VBRI Institute Allahabad	Feb 28-March 03, 2017
15.	National conference on recent advances on materials for sustainable energy (RAMSE 2018), organized by IIT-ISM Dhanbad	March 3-5, 2018
16.	International conference on recent trends in materials science & technology (ICMST 2018), organized by IIST Trivandrum	October 10-13, 2018
17.	International conference on nanostructured materials & devices (ICNMSD 2018), organized by University of Delhi	December 17-20, 2018
18.	International conference on nanoscience & nanotechnology (ICONN 2019), organized by SRM University	Jan 28-30, 2019
19.	First Indian materials conclave & 30 th annual general meeting of MRSI, organized by MRSI-IISc Bangalore	February 12-15, 2019
20.	Faculty development programme on “Recent trends in Nanoscience & Nanotechnology for Engineering applications”, organized by Dayananda Sagar Academy of Technology & Management-Bangalore	March 08, 2019
21.	International conference on Frontiers in Materials (F2DM)” organized by CNMS-Jain University	March 13-16, 2019
22.	International conference on Functional materials, ICFM 2020 organized by IIT Kharagpur	Jan 06-08 , 2020

16. International Travels & Collaboration

- (i) Travelled to University of Southampton, UK during 31.10.2014 to 09.11.2014 to Prof. Hywel Morgan's Laboratory under the UGC-UKIERI project for collaboration purpose.
- (ii) Travelled to University of Campinas, Brazil during 14.01.2015 to 24.01.2015 to Prof. Stansislav Moshkalev and Prof. Rogerio Gelamo under the DST-CnPq project for collaboration purpose.
- (iii) Travelled to University of Southampton, UK during 3.08.2015 to 10.08.2015 to Prof. Hywel Morgan's Laboratory under the UGC-UKIERI project for collaboration purpose.
- (iv) Travelled to National University of Singapore and Singapore during 28.06.2015 to 03.07.2015 to attend the ICMAT 2015 & IUMRS- ICA 2015 and delivered a talk.
- (v) Travelled to Israel Institute of Technology, Technion during 8.06.2016 to 12.06.2016 to deliver an invited talk at Department of Materials Science & Engineering".
- (vi) Travelled to Prof. Ana Orlavo's research group at ITMO University, Russia for 1 month (December 2019)

LIST OF PUBLICATIONS

h-index: 44, i10 index: 120, total citation: 9000.

1. Nanoribbons of 2D materials: A review on emerging trends, recent developments and future perspectives., Shinde, Pratik V, Tripathi, A, Ranjit Thapa, **Rout C.S.**, *Coordination Chemistry Reviews*, 453, 2022, 214335. (Impact factor: 22.31).
2. Understanding the charge storage mechanism of supercapacitors: *in situ/operando* spectroscopic approaches and theoretical investigations, A. Patra, Namsheer K., J.R. Rose, S. Sahoo, B. Chakraborty and **C.S. Rout**, *J. Mater. Chem. A*, 2021, 9, 25852 (Impact factor: 12.72).
3. Recent advances in Engineered metal oxides for high performance supercapacitor applications, M. Manikandan, S. Sahoo, **C.S. Rout** and B.

- Chakraborty, *J. Mater. Chem. A*, **2021**, 9, 17643 (Impact factor: 12.72).
- Schottky Diodes Based on 2D Materials for Environmental Gas Monitoring: A Review on Emerging Trends, Recent Developments and Future Perspectives, M. Mathew and **C.S. Rout**,^{*} ~~*J. Mater. Chem. C* **2021**, 2021,9, 395~~ (Impact factor: 7.059).
 - Advances in understanding the gas sensing mechanisms by *insitu* and *operando* spectroscopy, A. Sharma and **C.S. Rout**, *J. Mater. Chem. A*, 2021, 9, 18175 (Impact factor: 12.72).
 - Two dimensional transition metal phosphorous trichalcogenides (MPX₃): A review on emerging trends, current state and future perspectives, R. Samal, G. Sanyal, B. Chakraborty and **C.S. Rout**,^{*} ~~*J. Mater. Chem. A* 2021, 9, 2560~~ (Impact factor: 12.7).
 - Photo-powered integrated Supercapacitors: A review on recent developments, challenges and future perspectives, Namsheer K. and **C.S. Rout**^{*} "*J. Mater. Chem A*" 2021, 9, 8248. (Impact factor: 12.7).
 - Field emission applications of graphene-analogous two-dimensional materials: recent developments and future perspectives, A. Patra, M.A. More, D.J. Late and **C.S. Rout**^{*}, ~~*J. Mater. Chem. C*, 2021, 9, 18175~~ (Impact factor: 7.05).
 - Quasi-one-dimensional van der Waals TiS₃ nanosheets for energy storage applications: Theoretical predications and experimental validation, A. Patra, S. Kapse, R. Thapa, D.J. Late and **C.S. Rout**^{*}, ~~*Appl. Phys. Lett.*, 2022, 120, 103102~~ (Impact factor: 3.79).
 - Waste biomass-derived carbon-supported palladium-based catalyst for cross-coupling reactions and energy storage applications. Kempasiddaiah, M., Raj, K.S., Kandathil, V., Dateer, R.B., Sasidhar, B.S., Yelamaggad, C.V., **Rout, C.S.** and Patil, S.A., *Applied Surface Science*, 570, p.151156. (Impact factor: 6.70).

11. 1T-VS₂/MXene Hybrid as a Superior Electrode Material for Asymmetric Supercapacitors: Experimental and Theoretical Investigations. Sharma, A., Mane, P., Chakraborty, B. and **Rout, C.S.**, *ACS Applied Energy Materials*. 2021, 4, 14198 (Impact factor: 6.02).
12. Unveiling and engineering of third-order optical nonlinearities in NiCo₂O₄ nanoflowers, Sharma, A., Khan, P., Mandal, D., Pathak, M., **Rout, C.S.** and Adarsh, K.V., 2021. *Optics letters*, 46(23), pp.5930-5933. (Impact factor: 3.77).
13. All-solid-state asymmetric supercapacitors based on VS₄ nano-bundles and MXene nanosheets. Sharma, A., Patra, A., Namsheer, K., Mane, P., Chakraborty, B. and **Rout, C.S.**, 2021. *Journal of Materials Science*, 56(36), pp.20008-20025. (Impact factor: 4.22).
14. Promising 2D/2D MoTe₂/Ti₃C₂T_x Hybrid Materials for Boosted Hydrogen Evolution Reaction. Shinde, P.V., Mane, P., Late, D.J., Chakraborty, B. and **Rout, C.S.**, 2021. *ACS Applied Energy Materials*, 4(10), pp.11886-11897. (Impact factor: 6.02).
15. Stabilization of Orthorhombic CoSe₂ by 2D-rGO/MWCNT Heterostructures for Efficient Hydrogen Evolution Reaction and Flexible Energy Storage Device Applications. Samal, R., Mane, P., Bhat, M., Chakraborty, B., Late, D.J. and **Rout, C.S.**, 2021. *ACS Applied Energy Materials*, 4(10), pp.11386-11399. (Impact factor: 6.02).
16. Pulse-duration dependence of saturable and reverse saturable absorption in ZnCo₂O₄ microflowers. Khan, P., Yadav, R.K., Mondal, A., **Rout, C.S.** and Adarsh, K.V., 2021. *Optical Materials*, 120, p.111459. (Impact factor: 3.08).
17. Comparative Electrocatalytic Oxygen Evolution Reaction Studies of Spinel NiFe₂O₄ and Its Nanocarbon Hybrids. Shinde, P.V., Samal, R. and **Rout, C.S.**, 2021. *Transactions of Tianjin University*, pp.1-9. (Impact

factor: 1.03).

18. Heterostructured Metallic 1T VSe₂/Ti₃C₂T_x MXene Nanosheets for Energy Storage Applications, Sree Raj K.A., **Rout, C.S.**, *ACS Applied Nano Materials*, 2022, DOI: 10.1021/acsnm.2c00533. (Impactfactor: 5.097).
19. Co-Decorated Tellurium Nanotubes for Energy Storage Applications. Bhol, P., Swain, S., Jena, S., Bhatte, K., **Rout, C.S.**, Saxena, M., Jadhav, A.H. and Samal, A.K., 2021. *ACS Applied Nano Materials*, 4(9), pp.9008-9021. (Impact factor: 5.097).
20. Vertically aligned graphene analogues 2D materials: A review on emerging trends, recent developments and future perspectives, Shinde,Pratik V, R. Samal, **Rout C.S.**, *Advanced Mater. Interf.*, 2022, 2101959. (Impact factor: 6.1).
21. Microfluidic sensors based on two-dimensional materials for chemical and biological assessments, Sithara R., M. Mathew Shinde and **C.S. Rout.** *Mater. Adv.*, 2022, DOI: 10.1039/D1MA00929J. (Impact factor:)
22. MoWS₂ nanosheets incorporated nanocarbons for high energy density pseudocapacitive negatrode material and hydrogen evolution reaction, A. Patra and **C.S. Rout.** *Advanced Comp. & Hybrid Mater.* 2022 (*Accepted*). (Impact factor: 5.57).
23. Architecturally Robust Ti₃C₂T_x MXene-MoWS₂ nanosheets hybrid for high performance energy storage and conversion applications, A. Patra and **C.S. Rout.** *Mater. Chem. Front.* 2022 (*Accepted*). (Impact factor:6.78).
24. Sanyal, G., Vaidyanathan, A., **Rout, C.S.** and Chakraborty, B., 2021. Recent developments in two-dimensional layered tungsten dichalcogenides based materials for gas sensing applications. *Materials Today Communications*, 28, p.102717. (Impact factor: 2.67).
25. Enhanced energy storage performance and theoretical studies of 3D cuboidal MnSe₂ embedded MWCNTs composite, R. Samal, M. Bhat, S.

- Kapse, R. Thapa and **C.S. Rout**^{*}, *J. Colloid and Interf. Sci.* 2021, 598, 500. (Impact factor: 7.49).
26. Recent developments in photodetector applications of Schottky diodes based on 2D materials, B. Ezhilmaran, A. Patra, S. Benny, S. MR., A. VV, V. Bhat and **C.S. Rout**^{*}, ~~A. A. Munoz~~^{*}, *J. Mater. Chem. C* 2021, (DOI: 10.1039/D1TC00949D) (Impact factor: 7.05).
27. Multifunctional spinel MnCo₂O₄ based materials for energy storage and conversion: A review on emerging trends, recent developments and future perspectives, Josué M. Gonçalves, Murillo N.T. Silva, Kusha Kumar Naik, Paulo R. Martins, Diego P. Rocha, Edson Nossol, Rodrigo A. A. Munoz^{*}, Lucio Angnes, and ~~C.S. Rout~~^{*}, *J. Mater. Chem. A* 2021, 9, 3095 (Impact factor: 12.7).
28. Facile Hydrothermal Synthesis of CoFe₂O₄/Co₃O₄ Nanostructures for Efficient Oxygen Evolution Reaction, P. Shindhe, R. Samal, M.K. Singh, ~~C.S. Rout~~^{*}, *Nanomater. Sci. Engg.* 2021, 3, 22. (Impact factor: 3.533).
29. Enhanced electrochemical supercapacitive performance of boron doped carbon/cobalt pyrophosphate hybrid with high specific capacitance asymmetric device
30. A synergistic electrochemical approach of boron-doped carbon/cobalt pyrophosphate//MXene for high-performance all solid-state asymmetric devices, A. Padhy, R. Samal, **C.S. Rout, J.N. Behera**, *Sustainable Energy Fuels.*, (2022). DOI: 10.1039/D2SE00173J (Impact factor: 6.5).
31. Hierarchical NiCo₂S₄ Nanostructures Anchored on Nanocarbons and Ti₃C₂T_x MXene for High-Performance Flexible Solid-State Asymmetric Supercapacitors, M. Pathak and **C.S. Rout**, *ACS Appl. Nano Mater.*, (2022). (Accepted) (Impact factor: 6.6).
32. High performance asymmetric supercapacitors based on Ti₃C₂T_x MXene and electrodeposited spinel NiCo₂S₄ nanostructures, M. Pathak,

- R. Polaki and **C.S. Rout, RSC Adv.**, (2022). (Accepted) (Impact factor:4.4).
33. Effect of cobalt doping on the enhanced energy storage performance of 2D vanadium diselenide: Experimental and theoretical investigations, Sree Raj K.A., Sithara R, P. Johari, R. Polaki and **C.S. Rout, Nanotechnology**, (2022). (Accepted) (Impact factor: 3.8).
34. Quasi one dimensional vander Waals heterostructures for energy storage applications: Theoretical predictions and experimental validation, A. Patra, R. Thapa, D.J. Late and **C.S. Rout, Appl. Phys. Lett.** (2022). (Accepted) (Impact factor: 3.7).
35. Experimental and theoretical realization of an advanced bifunctional 2D δ -MnO₂ electrode for supercapacitor and oxygen evolution reaction via defect engineering. Samal, R., Kandasamy, M., Chakraborty, B. and **Rout, C.S.**, 2021. *International Journal of Hydrogen Energy*, 46(55), pp.28028-28042. (Impact factor: 5.81).
36. Facile Synthesis of Manganese Doped 2D Vanadium diselenide Nanosheets for High Performance Supercapacitor Applications, Sree Raj K.A., **C.S. Rout, Emergent Mater.**, 4, pages1037–1046 (2021). (Impact factor: 1.09).
37. Electrochemical biosensors based on Ti₃C₂T_x MXene: Future perspectives for on-site analysis. Mathew, M. and **Rout, C.S.**, 2021, *Current Opinion in Electrochemistry*, p.100782. (Impact factor: 7.2).
38. Synthesis of flower and biconcave shape CuS: Enhancement of supercapacitance properties via Ni-CuS nanocomposite formation, C. Behera, R. Samal, **C.S. Rout** and S.L. Samal, *Solid State Sci.* 2021 117, 2021, 106631. (Impact factor: 2.43).
39. Spinel NiFe₂O₄ nanoparticles decorated 2D Ti₃C₂ MXene sheets for efficient water splitting: experiments and theories. Shinde, P.V., Mane, P., Chakraborty, B. and **Rout, C.S.**, 2021. *Journal of Colloid and Interface*

- Science*. 602, 2021, Pages 232-241. (Impact factor: 8.12).
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