

# Curriculum Vitae



**Dr. Naresh Chandra Murmu, FNAE, FNASc**

**Chief Scientist/ Scientist -G**

**Head, Surface Engineering and Tribology Group**

**Head Designate, Business, Innovation and Skills Group & Head, Legal Section**

**CSIR-Central Mechanical Engineering Research Institute**

M G Avenue, Durgapur -713 209, West Bengal, India

&

**Professor and Dean, Faculty of Engineering Sciences**

**Academy of Scientific and Innovative Research(AcSIR), New Delhi**

**Nodal Scientist, Manufacturing & Robotics Sub-Vertical, CIE Theme, CSIR**

Email: murmu@cmeri.res.in / ncmurmu@gmail.com | M: +91-8016096858

**Date of Birth:** 1<sup>st</sup> Sept. 1971

# updated: 22.11.2022

## Educational Qualifications

- **B.E.**, 1992, Mechanical Engineering, IEST, Sibpur, India
- **M.E.**, 1994, Mechanical Engineering, Indian Institute of Science, Bangalore, India
- **Ph.D.**, 2010, Mechanical Engineering, Indian Institute of Technology (BHU), Varanasi, India

## Professional Experience

- **Visiting Scientist, Northwestern University, USA** (2011-2012) (*on Deputation*)
- **Visiting Scientist, University of Erlangen-Nuremberg, Germany** (2001-2003) (*on Deputation*)
- **Scientist, National Aerospace Laboratories, Bangalore** (1994-2003)
- **Scientist, CISR-Central Mechanical Engineering Research Institute, Durgapur** (2003-till date)

## Awards and Distinctions

- **Fellow of National Academy of Sciences, India (NASI)** 2022
- **Fellow of Indian National Academy of Engineering (INAE)** 2019
- **VASVIK Award** (Mechanical & Structural Sciences & Technology) 2015
- **National Design Award** (*Mechanical Engineering*) NDRF (2012)
- **CSIR@70 Recognition for Developing Five Axis Micro Milling Machine** (2012)
- **CSIR-Raman Research Fellowship** (2012)
- **DAAD fellowship -2001** (*German Academic Exchange Programme*).
- **Co-Author of MSEB Best Paper Award**, 2014 (Elsevier)

## Editorship/Member

- **Associate Editor**, Journal of the Institute of Engineers (India) Series –C
- **Co-Guest Editor**, Sivan, K., & Murmu, N. C. (2017). *Special Theme: India's Reusable Launch Vehicle Technology Demonstrator: The Future of Space Transportation System*.
- **Member**, CSIR-INAE Consultative Committee.
- **Member**, Expert Advisory Committee-AMT, Department of Science & Technology, New Delhi.
- **Member**, Lubricating Equipment Sectional Committee, PGD19, Bureau of Indian Standard

## Google Citation and Patents

**Peer Reviewed Journals: 111 | Patents: 10 [Granted: 01 Indian, Filed: 7 India & 2 US] |**

**Book Chapters: 4 | Copyrights/Design Reg.:7 | Technology Transfer: 2**

## Google Citation Indices

Citation Indices	All	Since 2017
Citations	4698	4411
h-index	38	36
i10-index	94	94

### Other Administrative Responsibilities in CSIR-CMERI

- Head, Project Monitoring and Evaluation (PME) (May18-Mar21)
- Head, Engineering Services Division (Jan, 17- Apr. 18)
- Chairman, Labour Management Committee
- Chairman, Medical Management Committee
- Chairman, Technical Purchase Committee
- Chairman & Member, Different recruitments /Assessments
- Chairman, Guest House Management Committee
- Chairman, Publication Ethics Committee
- Nodal Officer, RTI (related to Projects)
- Secretary, Research Council, CSIR-CMERI (2018-21)
- Member, Management Council, CSIR-CMERI (2014-16)
- PO, Disciplinary proceedings
- Chairman/Member, Different FFCs
- Member, Collegiums

### Peer Reviewed Journals

1. Shit, S., Bolar, S., Murmu, N. C., & Kuila, T. (2022). Minimal lanthanum-doping triggered enhancement in bifunctional water splitting activity of molybdenum oxide/sulfide heterostructure through structural evolution. *Chemical Engineering Journal*, 428, 131131. (I.F.- 10.652).
2. Bolar, S., Shit, S., Samanta, P., Murmu, N. C., Kolya, H., Kang, C. W., & Kuila, T. (2022). Conducting scaffold supported defect rich 3D rGO-CNT/MoS<sub>2</sub> nanostructure for efficient HER electrocatalyst at variable pH. *Composites Part B: Engineering*, 230, 109489. (I.F.- 9.078).
3. Ghosh, S., Samanta, P., Jang, W., Yang, C. M., Murmu, N. C., & Kuila, T. (2022). Improvement of the Supercapacitor Performance of Nickel Molybdenum Chalcogenides/Reduced Graphene Oxide Composites through Vanadium-Doping Induced Crystal Strain Relaxation and Band Gap Modification. *ACS Applied Energy Materials*, 5(2), 1528-1541. (I.F.- 6.024).
4. Shit, S., Bolar, S., Kolya, H., Kang, C. W., Murmu, N. C., & Kuila, T. (2022). Assisting the formation of S-doped FeMoO<sub>4</sub> in lieu of an iron oxide/molybdenum sulfide heterostructure: A unique approach towards attaining excellent electrocatalytic water splitting activity. *International Journal of Hydrogen Energy*, 47(21), 11128-11142. (I.F.- 5.816).
5. Das, R., Bej, S., Murmu, N. C., & Banerjee, P. (2022). Selective recognition of ammonia and aliphatic amines by CN fused phenazine derivative: A hydrogel based smartphone assisted 'opto-electronic nose' for food spoilage evaluation with potent anti-counterfeiting activity and a potential prostate cancer biomarker sensor. *Analytica Chimica Acta*, 1202, 339597. (I.F.- 6.558).
6. Saha, S. K., Murmu, M., Murmu, N. C., & Banerjee, P. (2021). Synthesis, characterization and theoretical exploration of pyrene based Schiff base molecules as corrosion inhibitor. *Journal of Molecular Structure*, 1245, 131098. (I.F.- 2.01).
7. Kumar, M. P., Dutta, S., & Murmu, N. C. (2021). Tool wear classification based on machined surface images using convolution neural networks. *Sādhanā*, 46(3), 1-12. (I.F.- 0.769).
8. Das, R., Bej, S., Ghosh, D., Murmu, N. C., Hirani, H., & Banerjee, P. (2021). Stimuli-responsive discriminative detection of Cu<sup>2+</sup> and Hg<sup>2+</sup> with concurrent sensing of S<sub>2</sub>-from aqueous medium and bio-fluids by CN fused azophenine functionalized "smart" hydrogel assay@ A potential biomarker sensor for Wilson's disease. *Sensors and Actuators B: Chemical*, 341, 129925. (I.F.- 7.100).

9. Shit, S., Bolar, S., Murmu, N. C., & Kuila, T. (2021). Tailoring the bifunctional electrocatalytic activity of electrodeposited molybdenum sulfide/iron oxide heterostructure to achieve excellent overall water splitting. *Chemical Engineering Journal*, 417, 129333. (I.F.- 10.652).
10. Shit, S., Samanta, P., Bolar, S., Murmu, N. C., Khanra, P., & Kuila, T. (2021). Synthesis of iron pyrite with efficient bifunctional electrocatalytic activity towards overall water splitting in alkaline medium. *Bulletin of Materials Science*, 44(3), 1-16. (I.F.- 1.392).
11. Shit, S., Samanta, P., Murmu, N. C., Khanra, P., & Kuila, T. (2021). Precursor-Dependent Formation of Iron Pyrite and its Application as Supercapacitor Electrode Material. *Journal of The Institution of Engineers (India): Series C*, 1-9. (I.F.- Pending).
12. Ghosh, S., Paul, A., Samanta, P., Landge, B., Mandal, S. K., Sinha, S., ... & Kuila, T. (2021). Influence of Transition Metals (Cu and Co) on the Carbon-Coated Nickel Sulfide Used as Positive Electrode Material in Hybrid Supercapacitor Device. *Journal of Composites Science*, 5(7), 180. (I.F.- Pending).
13. Samanta, P., Ghosh, S., Murmu, N. C., & Kuila, T. (2021). Effect of redox additive in aqueous electrolyte on the high specific capacitance of cation incorporated MnCo<sub>2</sub>O<sub>4</sub>@ Ni(OH)<sub>2</sub> electrode materials for flexible symmetric supercapacitor. *Composites Part B: Engineering*, 215, 108755. (I.F.- 7.635).
14. Mahato, P., Banerjee, P., Murmu, M., Hirani, H., Murmu, N. C., & Mishra, S. K. (2021). Investigation on Multifunctional Properties of Sputtered Ti-Si-BC Coating with Varied Thickness over Targeted Surface. *Journal of Materials Engineering and Performance*, 1-13. (I.F.- 1.652).
15. Sengupta, S., Murmu, M., Murmu, N. C., & Banerjee, P. (2021). Adsorption of redox-active Schiff bases and corrosion inhibiting property for mild steel in 1 molL<sup>-1</sup> H<sub>2</sub>SO<sub>4</sub>: Experimental analysis supported by ab initio DFT, DFTB and molecular dynamics simulation approach. *Journal of Molecular Liquids*, 326, 115215. (I.F.- 5.065).
16. Bolar, S., Shit, S., Samanta, P., Murmu, N. C., & Kuila, T. (2021). The structure–activity correlation of bifunctional MnO<sub>2</sub> polymorphic and MoS<sub>2</sub>-based heterostructures: a highly efficient, robust electrochemical water oxidation and reduction reaction catalyst in alkaline pH. *Sustainable Energy & Fuels*, 5(4), 1148-1157. (I.F.- 5.503).
17. Bolar, S., Shit, S., Murmu, N. C., Samanta, P., & Kuila, T. (2021). Activation Strategy of MoS<sub>2</sub> as HER Electrocatalyst through Doping-Induced Lattice Strain, Band Gap Engineering, and Active Crystal Plane Design. *ACS Applied Materials & Interfaces*, 13(1), 765-780. (I.F.- 8.758).
18. Shit, S., Ghosh, S., Samanta, P., Bolar, S., Murmu, N. C., & Kuila, T. (2021). Optimization of specific capacitance and water splitting efficiency of N-enriched carbon by incorporating oxides of transition metals via an ancient chemical technique. *Journal of Electroanalytical Chemistry*, 880, 114929. (I.F.- 3.218).
19. Bolar, S.; Shit, S.; Kumar, J. S.; Murmu, N. C.; Ganesh, R. S.; Inokawa, H.; Kuila, T. Optimization of Active Surface area of Flower like MoS<sub>2</sub> using V-doping towards Enhanced Hydrogen Evolution Reaction in Acidic and Basic Medium. *Applied Catalysis B: Environmental*, 2019, 254, 432-442. (I.F.- 16.683).
20. Shit, S., Samanta, P., Bolar, S., Murmu, N. C., & Kuila, T. (2020). Alteration in Electrocatalytic Water Splitting Activity of Reduced Graphene Oxide Through Simultaneous and Individual Doping of Lewis Acid/Base Center. *Electrochimica Acta*, (I.F.- 6.216), 137146.

21. Ball, A. K., Roy, S. S., Kisku, D. R., Murmu, N. C., & dos Santos Coelho, L. (2020). Optimization of drop ejection frequency in EHD inkjet printing system using an improved Firefly Algorithm. *Applied Soft Computing*. (I.F.:5.472)106438.
22. Ball, A. K., Das, R., Roy, S. S., Kisku, D. R., & Murmu, N. C. (2020). Modeling of EHD inkjet printing performance using soft computing-based approaches. *Soft Computing*, (I.F.:3.05) 24(1), 571-589.
23. Ball, A. K., Roy, S. S., Kisku, D. R., & Murmu, N. C. (2020). A New Approach to Quantify the Uniformity Grade of the Electrohydrodynamic Inkjet Printed Features and Optimization of Process Parameters Using Nature-Inspired Algorithms. *International Journal of Precision Engineering and Manufacturing*, (I.F. - 1.49) 21(3), 387-402.
24. Das, R., Ball, A. K., Roy, S. S., & Murmu, N. C. (2020). A Multi Criteria Decision Making Approach for Process Improvement of E-JET: An Experimental Investigation. *Journal of Advanced Manufacturing Systems*. (I.F.: 0.42) 19(03), 463-497
25. Mallisetty, P. K., Samanta, P., & Murmu, N. C. (2020). Nonlinear transient analysis of rigid rotor mounted on externally pressurized double-layered porous gas journal bearings accounting velocity slip. *Journal of the Brazilian Society of Mechanical Sciences and Engineering*,(I.F. -1.698), 42(10), 1-12.
26. Paul, S., Das, R., Seth, M., Hirani, H., Murmu, N. C., & Banerjee, P. (2020). A urea functionalized chemoreceptor for expeditious chromogenic recognition of toxic industrial pollutants Cu<sup>2+</sup> and CN<sup>-</sup> from real water sources and bio-fluids: Diagnosis of Wilson's disease from human urine. *Industrial & Engineering Chemistry Research*, (I.F. -3.573).
27. Sengupta, S., Murmu, M., Murmu, N. C., & Banerjee, P. (2020). Adsorption of redox-active Schiff bases and corrosion inhibiting property for mild steel in 1 molL<sup>-1</sup> H<sub>2</sub>SO<sub>4</sub>: Experimental analysis supported by ab initio DFT, DFTB and molecular dynamics simulation approach. *Journal of Molecular Liquids*, 115215. (I.F. - 5.065).
28. Shit, S., Ghosh, S., Samanta, P., Bolar, S., Murmu, N. C., & Kuila, T. (2020). Optimization of specific capacitance and water splitting efficiency of N-enriched carbon by incorporating oxides of transition metals via an ancient chemical technique. *Journal of Electroanalytical Chemistry*, 114929. (I.F. -3.18).
29. Shit, S., Samanta, P., Bolar, S., Murmu, N. C., & Kuila, T. (2020). Alteration in electrocatalytic water splitting activity of reduced graphene oxide through simultaneous and individual doping of Lewis acid/base center. *Electrochimica Acta*, 362, 137146. (I.F. -6.216).
30. Mondal, A., Hazra, A., Chakrabarty, J., Murmu, N. C., & Banerjee, P. (2020). A Harmonized Applied and Theoretical Exploration for Nanomolar Level Recognition of Perilous F<sup>-</sup> and CN<sup>-</sup> by Multichannel Chemosensor: Proposition of Hg<sup>2+</sup>-Mediated Logic Gate Imitator. *Chemistry Select*, 5(38), 11976-11985. (I.F. -1.811).
31. Shit, S., Bolar, S., Murmu, N. C., & Kuila, T. (2020). An account of the strategies to enhance the water splitting efficiency of noble-metal-free electrocatalysts. *Journal of Energy Chemistry*. (I.F. -7.216).
32. Ghosh, S., Samanta, P., Samanta, P., Murmu, N. C., & Kuila, T. (2020). Investigation of electrochemical charge storage efficiency of NiCo<sub>2</sub>Se<sub>4</sub>/RGO composites derived at varied duration and its Asymmetric supercapacitor device. *Energy & Fuels*,(I.F. -3.421).

33. Bolar, S., Shit, S., Murmu, N. C., & Kuila, T. (2020). FeNiSx@ MoS2 Heterostructure: A Bioinspired Nonprecious Electrocatalyst for the Hydrogen Evolution Reaction in Acidic and Basic Media. *ChemElectroChem*, 7(15), 3324-3335, (I.F. -4.154).
34. Shit, S., Ghosh, S., Bolar, S., Murmu, N. C., & Kuila, T. (2020). Understanding the Synergistic Effect in Oxygen Evolution Reaction Catalysis from Chemical Kinetics Point of View: An Iron Oxide/Nickel Oxide Case Study. *Journal of The Electrochemical Society*, 167(11), 116514, (I.F. -3.662).
35. Hazra, A., Bej, S., Mondal, A., Murmu, N. C., & Banerjee, P. (2020). Discerning Detection of Mutagenic Biopollutant TNP from Water and Soil Samples with Transition Metal-Containing Luminescence Metal–Organic Frameworks. *ACS omega*, 5(26), 15949-15961, (I.F. -2.58).
36. Murmu, M., Saha, S. K., Bhaumick, P., Murmu, N. C., Hirani, H., & Banerjee, P. (2020). Corrosion inhibition property of azomethine functionalized triazole derivatives in 1 mol L<sup>-1</sup> HCl medium for mild steel: Experimental and theoretical exploration. *Journal of Molecular Liquids*, 113508, (I.F. -5.065).
37. Ghosh, S., Samanta, P., Murmu, N. C., & Kuila, T. (2020). Investigation of electrochemical charge storage in nickel-cobalt-selenide/reduced graphene oxide composite electrode and its hybrid supercapacitor device. *Journal of Alloys and Compounds*, 155432, (I.F. -4.650).
38. Das, R., Roy, S. S., & Murmu, N. C. (2020). An experimental investigation for parametric appraisal of electrohydrodynamic-driven microfabrication approach using teaching and learning-based optimization. *Journal of the Brazilian Society of Mechanical Sciences and Engineering*, 42(5), (I.F. -1.689).
39. Samanta, P., Ghosh, S., Samanta, P., Murmu, N. C., & Kuila, T. (2020). Alteration in capacitive performance of Sn-decorated MnO<sub>2</sub> with different crystal structure: An investigation towards the development of high-performance supercapacitor electrode materials. *Journal of Energy Storage*, 28, 101281, (I.F. -3.762).
40. Bej, S., Das, R., Murmu, N. C., & Banerjee, P. (2020). Selective Identification and Encapsulation of Biohazardous m-Xylene among a Pool of Its Other Constitutional C<sub>8</sub> Alkyl Isomers by Luminescent d10 MOFs: A Combined Theoretical and Experimental Study. *Inorganic Chemistry*, 59(7), 4366-4376, (I.F. -4.85).
41. Bolar, S., Shit, S., Murmu, N. C., & Kuila, T. (2020). Doping-Assisted Phase Changing Effect on MoS<sub>2</sub> Towards Hydrogen Evolution Reaction in Acidic and Alkaline pH. *ChemElectroChem*, 7(1), 336-346, (I.F. -4.154).
42. Murmu, M., Sengupta, S., Pal, R., Mandal, S., Murmu, N. C., & Banerjee, P. (2020). Efficient tribological properties of azomethine-functionalized chitosan as a bio-lubricant additive in paraffin oil: experimental and theoretical analysis. *RSC Advances*, 10(55), 33401-33416, (I.F. -3.07).
43. Paul, G., Hirani, H., Kuila, T., & Murmu, N. C. (2019). Nanolubricants dispersed with graphene and its derivatives: an assessment and review of the tribological performance. *Nanoscale*. (I.F.- 6.895), 11(8), 3458-3483.
44. Adak, N. C., Chhetri, S., Murmu, N. C., Samanta, P., Srivastav, S., & T. Kuila (2019). Synergistic effect of Fe<sub>3</sub>O<sub>4</sub> anchored N-doped rGO hybrid on mechanical, thermal and electromagnetic shielding properties of epoxy composites. *Composites Part B: Engineering*, (I.F. 7.635) 166, 371-381

45. Ball, A. K., Das, R., Roy, S. S., Kisku, D. R., & Murmu, N. C. (2019). Experimentation modelling and optimization of electrohydrodynamic inkjet microfabrication approach: a Taguchi regression analysis. *Sādhanā*, (I.F. -0.769)44(7), 167.
46. Murmu, M., Saha, S. K., Murmu, N. C., & Banerjee, P. (2019). Amine cured double Schiff base epoxy as efficient anticorrosive coating materials for protection of mild steel in 3.5% NaCl medium. *Journal of Molecular Liquids*. (I.F.- 5.065) 278, 521-535.
47. Paul, G., Shit, S., Hirani, H., Kuila, T., & Murmu, N. C. (2019). Tribological behavior of dodecylamine functionalized graphene nanosheets dispersed engine oil nanolubricants. *Tribology International*, (I.F.- 4.271)131, 605-619
48. Murmu, M., Saha, S. K., Murmu, N. C., & Banerjee, P. (2019). Effect of stereochemical conformation into the corrosion inhibitive behaviour of double azomethine based Schiff bases on mild steel surface in 1 mol L<sup>-1</sup> HCl medium: An experimental, density functional theory and molecular dynamics simulation study. *Corrosion Science*, (I.F.- 6.479). 146, 134-151
49. Adak, N. C., Chhetri, S., Murmu, N. C., Samanta, P., Kuila, T., & Lee, J. H. (2019). Experimental and numerical investigation on the mechanical characteristics of polyethylenimine functionalized graphene oxide incorporated woven carbon fibre/epoxy composites. *Composites Part B: Engineering*, (I.F.- 7.635). 156, 240-251
50. Sharath Kumar J, Ghosh S., Murmu, N. C., Mandal, N., Kuila Tapas (2019), Electrochemical detection of H<sub>2</sub>O<sub>2</sub> using copper oxide-reduced graphene oxide heterostructure, *Journal of Nanoscience and Nanotechnology*, (I.F.- 1.354) 19(8), 5295-5302
51. Saha, S., Jang, W., Murmu, N. C., Koo, H., & Kuila, T. (2019). Optimization of Chemi-adsorption, EDLC, and Redox Capacitance Through Electro-precipitation Synthesis of Fe<sub>3</sub>O<sub>4</sub>/NiO@ rGO/h-BN for the Development of Hybrid Supercapacitor. *ChemistrySelect*, (I.F.- 1.505) 4(2), 589-599.
52. Adak, N. C., Chhetri, S., Murmu, N. C., Samanta, P., & Kuila, T. (2019). Analytical and experimental investigation on magnetorheological behavior of CoFe<sub>2</sub>O<sub>4</sub>-rGO-incorporated epoxy fluid composites. *Advanced Composites and Hybrid Materials*, 2(2), 266-278. (I.F.- Pending)
53. Chhetri, S., Samanta, P., Murmu, N. C., & Kuila, T. (2019). Anticorrosion Properties of Epoxy Composite Coating Reinforced by Molybdate-Intercalated Functionalized Layered Double Hydroxide. *Journal of Composites Science*, 3(1), 11. (I.F.- Pending)
54. Adak, N. C., Chhetri, S., Sabarad, S., Roy, H., Murmu, N. C., Samanta, P., & Kuila, T. (2019). Direct observation of micro delamination in graphene oxide incorporated carbon fiber/epoxy composite via in-situ tensile test. *Composites Science and Technology*, (I.F.- 7.094), 177, 57-65.
55. Shit, S.; Chhetri, S.; Jang, W.; Murmu, N. C.; Koo, H.; Samanta, P.; **Kuila, T.** (2018). Cobalt sulphide/nickel sulphide heterostructure directly grown on nickel foam: an efficient and durable electrocatalyst for overall water splitting application. *ACS Applied Materials and Interface*, (I.F.- 8.758)10, 27712-27722.
56. Chhetri, S.; Adak, N. C.; Samanta, P.; Murmu, N. C.; Kuila, T. (2018). Exploration of mechanical and thermal properties of the cetyltrimethylammonium bromide modified molybdenum disulfide (MoS<sub>2</sub>)/Linear low density polyethylene composites prepared by melt mixing. *Journal of Composite Sciences*, 2, 37. (I.F.- Pending).



57. Chhetri, S.; Adak, N. C.; Samanta, P.; Murmu, N. C.; Kuila, T. (2018). Rheological, mechanical, and thermal properties of silane grafted layered double hydroxide/epoxy composites. *Industrial & Engineering Chemistry Research*, 57, 8729-8739. (I.F.- 3.573).
58. Adak, N. C.; Chhetri, S.; Kuila, T.; Murmu, N. C.; Samanta, P.; Lee J. H.(2018). Effect of hydrazine reduced graphene oxide on Inter-laminar Fracture Toughness of woven carbon fiber/epoxy composite. *Composite Part B: Engineering*, (I.F.- 7.635)149, 22-30.
59. Saha, S.; Kumar, J. S.; Murmu, N. C.; Samanta, P.; Kuila, T. (2018). Controlled electrodeposition of Iron oxide/Nickel oxide@Ni for the investigation of the effect of stoichiometry and particle size on energy storage and water splitting application. *Journal of Materials Chemistry A*, (I.F.-11.301).6, 9657-9664.
60. Kumar, J. S.; Murmu, N. C.; Kuila, T. (2018). Recent trends in the graphene-based sensor for the detection of hydrogen peroxide. *AIMS Material Science*, 5, 422-466. (I.F.- Pending).
61. Saha, S., Samanta, P., Murmu, N. C., & Kuila, T. (2018). A review on the heterostructure nanomaterials for supercapacitor application. *Journal of Energy Storage*, (I.F.-3.762), 17, 181-202.
62. Chhetri, S., Adak, N. C., Samanta, P., Murmu, N. C., Hui, D., Kuila, T., & Lee, J. H. (2018). Investigation of the mechanical and thermal properties of l-glutathione modified graphene/epoxy composites. *Composites Part B: Engineering*, (I.F.- 7.635) 143, 105-112.
63. Saha, S., Samanta, P., Murmu, N. C., Banerjee, A., Ganesh, R. S., Inokawa, H., & Kuila, T. (2018). Modified electrochemical charge storage properties of h-BN/rGOSuperlattice through the transition from n to p type semiconductor by fluorine doping. *Chemical Engineering Journal*, (I.F.- 10.652) 339, 334-345.
64. Chhetri, S., Adak, N. C., Samanta, P., Mallisetty, P. K., Murmu, N. C., & Kuila, T. (2018). Interface engineering for the improvement of mechanical and thermal properties of covalent functionalized graphene/epoxy composites. *Journal of Applied Polymer Science*, (I.F.- 2.52)135(15).
65. Ghosh, P., Hazra, A., Ghosh, M., Murmu, N. C., & Banerjee, P. (2018). Halide salts and their structural properties in presence of secondary amine based molecule: A combined experimental and theoretical analysis. *Journal of Molecular Structure*, (I.F.- 2.011)1157, 444-449
66. Adak, N. C., Chhetri, S., Kim, N. H., Murmu, N. C., Samanta, P., & Kuila, T. (2018). Static and Dynamic Mechanical Properties of Graphene Oxide-Incorporated Woven Carbon Fiber/Epoxy Composite. *Journal of Materials Engineering and Performance*, (I.F.- 1.652), 27(3), 1138-1147.)
67. Saha, S. K., Murmu, M., Murmu, N. C., Obot, I. B., & Banerjee, P. (2018). Molecular level insights for the corrosion inhibition effectiveness of three amine derivatives on the carbon steel surface in the adverse medium: A combined density functional theory and molecular dynamics simulation study. *Surfaces and Interfaces*, (I.F.- 1.665)10, 65-73.
68. Adak, N. C., Chhetri, S., Murmu, N. C., Samanta, P., & Kuila, T. (2018). Effect of Thermally Reduced Graphene Oxide on Mechanical Properties of Woven Carbon Fiber/Epoxy Composite. *Crystals*, (I.F.- 2.144) 8(3), 111.
69. Kumar, J. S., Murmu, N. C., Samanta, P., Banerjee, A., Ganesh, R. S., Inokawa, H., & Kuila, T. (2018). Novel synthesis of a Cu<sub>2</sub>O-graphene nanoplatelet composite through a two-step electrodeposition method for selective detection of hydrogen peroxide. *New Journal of Chemistry*, (I.F.- 3.228) 42(5), 3574-3581.
70. Chhetri, Suman, Nitai Chandra Adak, Pranab Samanta, Nilrudra Mandal, Tapas Kuila, and Naresh Chandra Murmu. "Investigation of mechanical and thermal properties of the cetyltrimethylammonium bromide

- functionalized molybdenum disulfide (MoS<sub>2</sub>)/epoxy composites." *Polymer Bulletin*, (I.F.-1.858).75, no. 1 (2018): 327-343.
71. Ghosh, P.; Roy, P.; Ghosh, A.; Jana, S.; Murmu, N. C.; Mukhopadhyay, S. K. and Banerjee, P\*. Explosive and pollutant TNP detection by structurally flexible SOFs: DFT-D3, TD-DFT study and in vitro recognition. *Journal of Luminescence*, (I.F.-3.280) 2017, 185,272-278.
  72. Saha, S. K., Murmu, M., Murmu, N. C., Obot, I. B., & Banerjee, P. (2018). Molecular level insights for the corrosion inhibition effectiveness of three amine derivatives on the carbon steel surface in the adverse medium: A combined density functional theory and molecular dynamics simulation study. *Surfaces and Interfaces* (I.F.-1.665) 10, 65-73.
  73. Adak, N. C., Chhetri, S., Kim, N. H., Murmu, N. C., Samanta, P., & Kuila, T. (2018). Static and Dynamic Mechanical Properties of Graphene Oxide-Incorporated Woven Carbon Fiber/Epoxy Composite. *Journal of Materials Engineering and Performance*, (I.F.-1.652) 27(3), 1138-1147.
  74. Kumar, M. P., De, S., Samanta, P., & Murmu, N. C. (2018). A comprehensive numerical model for double-layered porous air journal bearing at higher bearing numbers. *Proceedings of the Institution of Mechanical Engineers, Part J: Journal of Engineering Tribology*, (I.F.-1.397) 232(5), 592-606.
  75. Saha, S.; Samanta, P.; Murmu, N. C.; Kuila, T. (2017) Investigation of surface plasmonpolariton and electrochemical property of covalent and non-covalent functionalized reduced graphene oxide. *Physical Chemistry Chemical Physics*. (I.F.-3.430) 19, 28588 - 28595.
  76. Jana, M.; Samanta, P.; Murmu, N. C.; Kuila, T.(2017) Surface modification of reduced graphene oxide through successive ionic layer adsorption and reaction method for redox dominant supercapacitor electrodes. *Chemical Engineering Journal*. (I.F.-10.652).330, 914-925.
  77. Chhetri, S.; Adak, N. C.; Samanta, P.S.; Murmu, N. C.; Kuila, T. (2017) Functionalized reduced graphene oxide/epoxy composites with enhanced mechanical properties and thermal stability. *Polymer Testing*, (I.F.-3.275) 63, 1-11.
  78. Jana, M.; Samanta, P.; Murmu, N. C.; Kuila, T. (2017) Morphology controlled synthesis of MnCO<sub>3</sub>-RGO materials and their supercapacitor applications. *Journal of Materials Chemistry A*. (I.F.- 11.301). 5, 12863-12872.
  79. Chhetri, S.; Adak, N. C.; Samanta, P.; Mandal, N.; Kuila, T.; Murmu, N. C. (2017) Investigation of mechanical and thermal properties of the cetyltrimethylammonium bromide functionalized molybdenum disulfide (MoS<sub>2</sub>)/epoxy composites. *Polymer Bulletin*. (I.F.-1.858).(doi:10.1007/s00289-017-2037-8)
  80. Saha, S., Samanta, P., Murmu, N. C., Kim, N. H., Kuila, T., & Lee, J. H. (2017). Electrochemical functionalization and in-situ deposition of the SAA@ rGO/h-BN@ Ni electrode for supercapacitor applications. *Journal of Industrial and Engineering Chemistry*, (I.F 3.737).52, 321-330.
  81. Saha, S.; Jana, M.; Samanta, P.; Murmu, N. C.; Kim, N. H.; Kuila, T, Lee, J. H. (2017) Investigation of band structure and electrochemical properties of h-BN/rGO composites for asymmetric supercapacitor applications. *Materials Chemistry and Physics*. (I.F.-3.408).190, 153-165.
  82. Jana, M.; Saha, S.; Samanta, P.; Murmu, N. C.; Kim, N. H.; Kuila, T, Lee, J. H. (2017) A successive ionic layer adsorption and reaction (SILAR) method to fabricate a layer-by-layer (LbL) MnO<sub>2</sub>-reduced graphene oxide assembly for supercapacitor application. *Journal of Power Sources*. (I.F.- 8.247)340, 380-392.



83. Chhetri, S.; Samanta, P.; Murmu, N. C.; Srivastava, S. K.; Kuila, T. (2017) Electromagnetic interference shielding and thermal properties of non-covalently functionalized reduced graphene oxide/epoxy composites. *AIMS Materials Science*, 4, 61-74.(**IF: Pending**)
84. Jana, M.; Saha, S.; Samanta, P.; Murmu, N. C.; Kim, N. H.; Kuila, T, Lee, J. H. (2017) Investigation of band structure and electrochemical properties of h-BN/rGO composites for asymmetric supercapacitor applications. *Materials Chemistry and Physics*. (**I.F.-3.408**).190, 153-165.
85. Jana, M.; Saha, S.; Samanta, P.; Murmu, N. C.; Kim, N. H.; Kuila, T, Lee, J. H. (2017) A successive ionic layer adsorption and reaction (SILAR) method to fabricate a layer-by-layer (LbL) MnO<sub>2</sub>-reduced graphene oxide assembly for supercapacitor application. *Journal of Power Source*. (**I.F.- 8.247**) 340, 380-392.
86. Saha, S.; Jana, M.; Samanta, P.; Murmu, N. C.; Kuila,(2016) T. Efficient access of voltametric charge in hybrid supercapacitor configured with potassium incorporated nano-graphitic structure derived from cotton (Gossypium arboreum) as negative and Ni(OH)<sub>2</sub>/rGO composite as positive electrode. *Industrial & Engineering Chemistry Research*. (**I.F.- 3.573**) 55, 11074-11084.
87. Chhetri, S., Samanta, P., Murmu, N. C., Srivastava, S. K., & Kuila, T. (2016). Effect of Dodecyl Amine Functionalized Graphene on the Mechanical and Thermal Properties of Epoxy-Based Composites. *Polymer Engineering & Science*, (**I.F.-1.917**) 56(11), 1221-1228.
88. Saha, S.; Chhetri, S.; Khanra, P.; Samanta, P.; Koo, H.; Murmu, N. C.; Kuila, T. (2016) *In-situ* hydrothermal synthesis of MnO<sub>2</sub>/NiO@Ni hetero structure electrode for hydrogen evolution reaction and high energy asymmetric supercapacitor applications. *Journal of Energy Storage*. (**I.F.- 3.762**).6, 22-31.
89. Kumar, J. S.; Jana, M.; Khanra, P.; Samanta, P.; Koo, H.; Murmu, N. C.; Kuila, T.(2016) One pot synthesis of Cu<sub>2</sub>O/RGO composite using mango bark extract and exploration of its electrochemical properties. *Electrochimica Acta*. (**I.F.- 6.216**)193, 104-115.
90. Jana, M.; Saha, S.; Samanta, P.; Murmu, N. C.; Kim, N. H.; Kuila, T, Lee, J. H. (2016) Growth of Ni-Co binary hydroxide on reduced graphene oxide surface by a successive ionic layer adsorption and reaction (SILAR) method for high performance asymmetric supercapacitor electrode. *Journal of Materials Chemistry A*. (**I.F.- 11.301**). 4, 2188-2197.
91. Saha, S.; Jana, M.; Khanra, P.; Samanta, P.; Koo, H.; Murmu, N. C.; Kuila, T.(2016) Band gap modified boron doped NiO/Fe<sub>3</sub>O<sub>4</sub> nanostructure as the positive electrode for high energy asymmetric supercapacitor. *RSC Advances*. (**I.F.- 3.070**).6, 1380-1387.
92. Jana, M.; Kumar, J. S.; Khanra, P.; Samanta, P.; Koo, H.; Murmu, N. C.; Kuila, T. (2016) Superior performance of asymmetric supercapacitor based on reduced graphene oxide-manganese carbonate as positive and sono-chemically reduced graphene oxide as negative electrode materials. *Journal of Power Sources*. (**I.F.- 8.247**). 303, 222-233.
93. Ghosh, P., Roy, P., Ghosh, A., Jana, S., Murmu, N. C., Mukhopadhyay, S. K., & Banerjee, P. (2017) Explosive and pollutant TNP detection by structurally flexible SOFs: DFT-D3, TD-DFT study and in vitro recognition. *Journal of Luminescence*, (**I.F.- 3.280**). 185, 272-278.
94. Saha, S. K., Murmu, M., Murmu, N. C., & Banerjee, P.(2016) Evaluating electronic structure of quinazolinone and pyrimidinone molecules for its corrosion inhibition effectiveness on target specific mild steel in the acidic medium: A combined DFT and MD simulation study. *Journal of Molecular Liquids*. (**I.F.- 5.065**).224, 629-638.

95. Saha, S. K., Hens, A., Murmu, N. C., & Banerjee, P.(2016) A comparative density functional theory and molecular dynamics simulation studies of the corrosion inhibitory action of two novel N-heterocyclic organic compounds along with a few others over steel surface. *Journal of Molecular Liquids*. (I.F.- 5.065).16, 215, 486-495.
96. Chowdhury, A. R., Ghosh, P., Roy, B. G., Mukhopadhyay, S. K., Murmu, N. C.,& Banerjee, P. (2015) Cell permeable fluorescent colorimetric Schiff base chemoreceptor for detecting F<sup>-</sup> in aqueous solvent. *Sensors and Actuators B: Chemical*, (I.F.- 7.100) 220, 347-355.
97. Saha, S.; Jana, M.; Samanta, P.; Murmu, N. C.;Kuila, T. (2015) In situ preparation of SAC-RGO@Ni electrode by electrochemical functionalization of reduced graphene oxide using sulfanilic acid azocromotrop and its application in Asymmetric supercapacitor. *Journal of Materials Chemistry A*. (I.F.- 11.301) 3, 19461-19468.
98. Saha, S.; Jana, M.; Khanra, P.; Samanta, P.; Koo, H.; Murmu, N. C.; Kuila, T. (2015) Band gap engineering of boron nitride by graphene and its application as positive electrode material in asymmetric supercapacitor device. *ACS Applied Materials & Interfaces*. (I.F.- 8.758) 7, 14211-14222.
99. Jana, M.; Saha, S.; Khanra, P.; Samanta, P.; Koo, H.; Murmu, N. C.; Kuila, T. (2015) Non-covalent functionalization of reduced graphene oxide using sulfanilic acid azocromotrop and its application as supercapacitor electrode material. *Journal of Materials Chemistry A*. (I.F.- 11.301) 3, 7323-7331.
- 100.Jana, M.; Saha, S.;Samanta, P.; Murmu, N. C.; Kim, N. H.; Kuila, T.; Lee, J. H. (2015) Development of high energy density supercapacitor through hydrothermal synthesis of RGO/nano-structured cobalt sulphide composites. *Nanotechnology*. (I.F.- 3.551). 26, 075402
- 101.Jana, M.; Saha, S.; Samanta, P.; Murmu, N. C.; Lee, J. H.; Kuila, T. (2015) Investigation of the capacitive performance of tobacco solution reduced graphene oxide. *Materials Chemistry and Physics*. (I.F.- 3.408).151, 72-80.
- 102.Saha, S.; Jana, M.; Samanta, P.; Murmu, N. C.; Kim, N. H.; Kuila, T.; Lee, J. H. (2014) Hydrothermal synthesis of Fe<sub>3</sub>O<sub>4</sub>/RGO composites and investigation of electrochemical performances for energy storage application. *RSC Advances*, (I.F.- 3.070). 4, 44777-44785.
- 103.Phani Kumar, M., Samanta, P., &Murmu, N. C.,(2015) Rigid Rotor Stability Analysis on Finite Hydrostatic Double-Layer Porous Oil Journal Bearing with Velocity Slip. *Tribology Transactions*, (I.F.-1.511)58(5), 930-940.
- 104.Kumar, M. P., Samanta, P., & Murmu, N. C. (2015) Investigation of velocity slip effect on steady state characteristics of finite hydrostatic double-layered porous oil journal bearing. *Proceedings of the Institution of Mechanical Engineers, Part J: Journal of Engineering Tribology*, (I.F.-01.397). 229(7), 773-784.
- 105.Chakraborty, T., Hens, A., Kulashrestha, S., Murmu, N. C., & Banerjee, P. (2015) Calculation of diffusion coefficient of long chain molecules using molecular dynamics. *Physica E: Low-dimensional Systems and Nanostructures*, (I.F.-3.570)69, 371-377
- 106.Saha, S. K., Ghosh, P., Hens, A., Murmu, N. C., & Banerjee, P.(2015) Density functional theory and molecular dynamics simulation study on corrosion inhibition performance of mild steel by mercapto-quinoline Schiff base corrosion inhibitor. *Physica E: Low-dimensional Systems and Nanostructures*, 66, 332-341. (I.F.-3.570)
- 107.Ghosh, P., Chowdhury, A. R., Saha, S. K., Ghosh, M., Pal, M., Murmu, N. C., & Banerjee, P. (2015) Synthesis and characterization of redox non-innocent cobalt (III) complexes of a O, N, O donor ligand:

Radical generation, semi-conductivity, antibacterial and anticancer activities. *Inorganica Chimica Acta*, (IF:2.046).2015, 429, 99-108.

108. Jana, M.; Khanra, P.; Murmu, N. C.; Lee, J. H.; Kuila, T. (2014) Covalent surface modification of chemically derived graphene and its application as supercapacitor electrode material. *Physical Chemistry Chemical Physics*, (I.F.- 3.430).16, 7618-7626.
109. Jana, M.; Khanra, P.; Murmu, N. C.; Lee, J. H.; Kuila, T. (2014) Bio-reduction of graphene oxide using drained water from soaked mung beans (*Phaseolus aureus* L) and its application as energy storage electrode material. *Materials Science and Engineering B*, (I.F.- 4.706) 186, 33-40. Achieved **MSEB Best Paper Award** from Elsevier in (*Selected from 171 Published Article*).
110. Mandal, N., Roy, H., Mondal, B., Murmu, N. C., & Mukhopadhyay, S. K. (2012). Mathematical Modeling of Wear Characteristics of 6061 Al-Alloy-SiCp Composite Using Response Surface Methodology. *Journal of materials engineering and performance*, (I.F.- 1.652) 21(1), 17-24 .
111. Murmu, N. C. (2011) Comparison of response surface methodology and artificial neural network technique for prediction of wear of 6061 al-alloy—SiCp composite. *International Journal of Mechanical and Materials Engineering*, 6(3), 437-444. (IF Pending)

## Conference Proceedings

1. Chhetri, S.; Adak, N.; Samanta, P.; Murmu, N. C.; Kuila, T. Investigation of mechanical properties of non-covalently functionalized reduced graphene oxide/epoxy composite. *Advanced Functionalized Materials Processing & Manufacturing*, February 2-3, 2017, Page 18.
2. Kumar, J. S.; Balel, J.; Samanta, P.; Murmu, N. C.; Kuila, T. One pot synthesis of Cu<sub>2</sub>O/RGO composite using clove extract for electrochemical sensing of hydrogen peroxide. *Advanced Functionalized Materials Processing & Manufacturing*, February 2-3, 2017, Page 155.
3. Jana, M.; Chandra, S. Samanta, P.; Murmu, N. C.; Kuila, T. Growth of Ni-Co binary hydroxide reduced graphene oxide over nickel foam substrate by a facile successive ionic layer adsorption and reduction (SILAR) method for supercapacitor applications. *Advanced Functionalized Materials Processing & Manufacturing*, February 2-3, 2017, Page 180.
4. Saha, S.; Samanta, P.; Murmu, N. C.; Kuila, T. N-doped nano graphite sheet for energy storage applications. *Advanced Functionalized Materials Processing & Manufacturing*, February 2-3, 2017, Page 184.
5. Jana, M.; Samanta, P.; Murmu, N. C.; Kim, N. H.; Kuila, T.; Lee, J. H. Development of cobalt sulfide-graphene composite for supercapacitor applications. *Compos Res* 2016, 29, 167-172.
6. Chhetri, S.; Samanta, P.; Murmu, N. C.; Kuila, T.; Lee, J. H. Enhanced mechanical properties of functionalized graphene oxide/linear low density polyethylene composites prepared by melt mixing. *Compos Res* 2016, 29, 173-178.
7. Saha, S.; Jana, M.; Samanta, P.; Murmu, N. C.; Lee, J. H.; Kuila, T. Self charging sulfanilic acid azocromotrop/reduced graphene oxide decorated nickel oxide/iron oxide solar supercapacitor for energy storage application. *Compos Res* 2016, 29, 179-185.
8. Chhetri, S.; Samanta, P.; Murmu, N. C.; Srivastava, S. K.; Kuila, T. Electromagnetic interference shielding and thermal properties of non-covalently functionalized reduced graphene oxide/epoxy composites. *AIMS Materials Science* 2017, 4, 61-74.
9. Murmu, N. C., Samanta, P., Das, P, Numerical investigation on delamination in different coatings of cutting tools used in micro-machining applications, *ASIATRIB* 2014, 17-20 February, 2014 at Agra, India.
10. Sahoo, P, Murmu, N. C., Understanding the role of emulsifiers defined by chemistry and structure to the performance of metal working nanoemulsions. *ASIATRIB* 2014, 17-20 February, 2014 at Agra, India.
11. Samanta, P, Shetty, P., Banerjee, P., Kuila, T., Murmu, N. C., Tyre Pyrolysis Oil as a Lubricant, *ASIATRIB* 2014, 17-20 February, 2014 at Agra, India.
12. Samanta, P, Murmu, N. C., Numerical Investigation on Static and Dynamic Performances of foil air journal bearings, 8th International Conference on Industrial tribology, *ICIT-2012*, Pune, India.
13. Murmu, N. C., Samanta, P., Geometry optimization of textured micro thrust bearings, 8th International Conference on Industrial tribology, *ICIT-2012*, Pune, India.
14. Das, L G, Samanta, P., Murmu, N. C., A Unified Design Methodology for Micro Gas Turbine, 11th Asian International Conference on Fluid Machinery and 3rd Fluid Power Technology Exhibition, 21-23 November, 2011, Indian Institute of Technology, Madras, Chennai - 600 036 India.
15. Murmu, N C, Bhakta, D. K., Experimental investigation of lives of ball bearings at higher level of reliabilities, 7th International Conference on Industrial Tribology (*ICIT'10*), December 2-4, 2010, Ispat Bhawan, Ranchi, India
16. Murmu, N. C., "Design of experiments based simulated analysis of air bearing and its application in optimization", International Conference on Trends in Product Life Cycles Modeling, Simulation and Synthesis (*PLMSS-2008*), November 17-20, 2008, Bangalore, India.
17. Murmu, N. C, Valgan, R., "Detection of defects in formed sheet metal using medial axis transformation (MAT)", *SPIE's international Symposium for Optical Metrology*, June 2003, Munich, Germany.
18. Murmu, N. C., Bhakta, D. K., Harsha, A. P., "Application of Artificial Neural network for Prediction of Residual Life of Rolling Element Bearings", 9th International Tribology Conference, April, 2-4 2008, Pretoria, South Africa.
19. Weckenmann, A, Nelbantic, K., Valgan, R. and Murmu, N. C., "The Visualization of conformity and wear of cutting tool inserts", *The 7th Fall workshop on VISION, MODELLING AND VISUALISATION* 2002, Er

langen, Germany.

20. Murmu. N. C, Mukhopadhyay. S. K, Mandal, N, Thakre G. D, “Prediction of wear behavior of 6061 Al-alloy -SiCp composite under combined rolling-sliding using response Surface Methodology”, Brisbane, Australia, The Australian conference of Tribology (AUSTTRIB-2006).
21. Murmu. N. C, Thakre G. D, Mandal N, “Modeling of wear behavior of 6061 Al-alloy-SiCp composite using Artificial Neural Network”, Kanazawa, Japan, The Asian conference of Tribology (ASIATRIB-2006).
22. Murmu. N. C, Mandal. N, Thakre G. D, “An investigation of wear behavior under combined rolling-sliding of 6061 Al-alloy-SiCp Composite” Krakow, Poland, The International symposium on Tribology (INSYCON T-2006).
23. Mandal. N, Thakre. G. D, Murmu. N. C, Bhakta. D. K, “An investigation to determine the effects of various process parameters of lubrication using modern statistical techniques” Virginia, 61st meeting of the society for machinery failure prevention technology (MFPT-2007).
24. Kumar S.B, Murmu. N. C, Thakre. G. D, Mandal. N, “Design Optimization and Vibration Behavior of Bearing Holder for a Tribological system” at Bengal Engg College, Shibpur, Howrah, International Conference on vibration problem (ICOVP-2007).
25. Thakre. G. D, Murmu. N. C, Mandal. N, Bhakta. D. K, “Condition monitoring and Diagnosis of Deep Groove Ball Bearings”, ISM-Dhanbad, National Seminar on condition monitoring overview & advanced technique (COMOAT-2006)
26. Mandal, N., Koshti, R. G., Murmu, N. C. “The Application of Response Surface Methodology for predicting effects of process parameters in EHL”, Conference on Recent Advances of Industrial Tribology and Maintenances, 2006, Rourkella.
27. Murmu, N. C, Mondal, B. N., “Modeling of process parameters of investment casting of Al-alloy using artificial neural network”, National Symposium on Investment Casting, Howrah, 2006.
28. Murmu, N. C., Bhakta, D. K., Harsha, A. P., “Prognosis of Remaining Life of Rolling Element Bearings by using Artificial Neural Network Technique.”, World Tribology Congress 2009, Kyoto, Japan, September 6 – 11, 2009
29. Majumder, B. C., Murmu, N. C., “On Simplified Solutions in Tribological Design of Machine Components” , 14th National Conference on Machines and Mechanisms (NaCoMM-09), NIT, Durgapur, India, December 17-18, 2009
30. Murmu, N. C., Bhakta, D. K., Mandi, K. P., “Development of Gantry Type Five Axis Micro Milling Machine Tool”, Sixth International Conference on Precision, Meso, Micro and Nano Engineering, December 11-12, 2009.
31. Das, Sumanta, Bhakta, D. K., Murmu, N. C., “A PC based control system for 5Axis  $\mu$ -Milling: integration and control”, Recent Advances of machine tools and Maintenances 2010, Jadavpur.

### **Patents**

- i) S. K. Giri, P. Bhattacharyya, S. Sen, N.C. Murmu, S. Sadhukhan, **Switched reconfigurable multi-converter multi source energy storage system configuration for electrified vehicle and power flow control scheme thereof**, [13/09/2022 –App. No. IN202211052409] (US patent is under process).
- ii) S. K. Giri, P. Bhattacharyya, S. Gorai, S. Sen, N.C. Murmu, **Non-isolated multi port DC-DC converter to integrate multiple energy sources for electrified vehicles**, [14/09/2022 – ref. No. 0175NF2022] (US patent is under process).
- iii) N. C. Murmu, Phani Kumar, Bhagat, A N, **Measuring the Progression of Wear in Wire drawing Die using Acoustic Emission Technique**, (3954DEL2015) on 04/12/2015 (with Tata Steel, Jamshedpur)
- iv) P. Samanta, N C Murmu, L. G Das, **Foil Bearing and Its Supporting Arrangements** filed on 30/03/2016 (App No-20161101067)

- v) Saha, S, Banerjee, P., **Murmu, N. C., Salivary fluoride detection: An indigenous way to diagnose human fluorosis** [08/07/2016 –App. No. C201611039325].
- vi) Jana, M, Kuila, T, Samanta, P, **Murmu, N. C. Development of scaled-up Graphine oxide production technology starting from natural flake graphite** [13/02/2017 –CSIR-CMERI].
- vii) Kuila, T.; Jana, M.; Samanta, P.; **Murmu, N. C. Development of scaled-up graphite oxide production technology starting from natural flake graphite.** Docket no. 36326. CBR. No. 20266, Patent Office Application No. 201711019808, Filled on 06/06/2017 (Ref. No. 0045NF2017).
- viii) Kuila, T.; Saha, S.; Samanta, P.; **Murmu, N. C. Asymmetric supercapacitor of sulfanilic acid azo chromotrop functionalized reduced graphene oxide/hexagonal boron nitride superlattice.** Patent Office Application No. 201711029465, Filed on 21/08/2017 (Ref. No. 0072NF2017).
- ix) Kuila, T.; Jana, M.; Samanta, P.; **Murmu, N. C.; Biswas, S. Fast charging and storage unit for bi-cycle lighting.** Patent Office Application No. 201711030708, Filed on 30/08/2017 (Ref. No. 0061NF2017).
- x) Kalyani B.N., Kharabe, S. M, Yadav, M. S., Lomate, D. P., Ukhande, M. R., Tilekar, G. M., Khasnis, V. H., Singh, R. K., Takale, M. U., Mallisetty, P. K., Murmu, N. C., Samanta, P., Gentzen J., Milbrandt, M., Zachaus, R., Blau, P., Sterzing, A., Hochmuth, C., **A Hollow crankshaft and method of manufacturing it** (201721037158) dated 20/10/2017 (filed by Bharat Forge Pvt. Ltd, Pune)

### **Copyrights/Design Registration**

- i) High Speed Foil Bearing Housing for Small Turbo Machines (Ref. CSIR-CMERI/IPMG/DR/2014/1)
- ii) Drawings of seven components of “A Five Axis Micro Milling Machine” [Ref. CSIR-CMERI /IPMG/Copyright /2012/3]
- iii) Drawings of three components of “Micro Linear Stage” [Ref. CSIR-CMERI /IPMG/Copyright /2012/6]
- iv) A Desktop Dip pen Nanolithography system [filed 25/01/2017: CSIR-CMERI].
- v) An initiative in waste sludge management for disposed material of fluoride removal water filter plant [filed 22/02/2017: CSIR-CMERI].
- vi) Novel approach for FeIII promoted fusion reaction towards application in dip pen nano lithography [filed 29/01/2017: CSIR-CMERI].
- vii) Plasma treatment of hospital waste [filed 29/01/2017: CSIR-CMERI].

### **Technology Transfer**

- a) **Large Scale Graphene Oxide Production Technology: Rs. 17.25 Lacs 9 (Non-Exclusive Basis)**  
This was transferred to **M/s AUROPOL India Pvt. Ltd** (Specialty Chemical Industry with more than 20 Cr. Turnover and having sales coverage in South East Asia, Middle east and Europe). The candidate has contributed in designing special type of cooling jacket without involvement of costly cooling coil. Further he developed special type of innovative filtration process thus reducing the cost of (Research Grade) graphene production to Rs. 10.34 per gram. <https://techindiacsir.anusandhan.net/online/Control.do? sucstr>
- b) **Smart Dimmable Led Street Lighting System**  
Technology is transferred to M/S Koley Engineering Works, Howrah @ Rs. 5 Lakhs (Non-Exclusive Basis) IPR Status: Copyright, Name "Electrical Drawings of Intelligent Street Light Control System", registration No. L-86487/2019 dated 22/10/2019. The aforesaid developed technology will save up to 60% of the energy consumption in comparison with conventional LED Street Lighting system. Such a system comprising of 1000 light poles will save 116 metric ton of carbon footprint in a year.



### Book Chapters

1. Kuila, T.; Banerjee, P.; **Murmu, N. C.** “Surface Modification of Graphene” In “Advanced Carbon Materials and Technology” Ed. A. Tiwari and S. K. Shukla, WILEY-Scrivener Publisher’s Print ISBN: 9781118686232; Online ISBN: 9781118895399; DOI: 10.1002/9781118895399.
2. Kuila, T.; Dong, Y. S.; **Murmu, N. C.** “Graphene/conjugated polymer nanocomposites for optoelectronic and biological applications” in “Fundamentals of Conjugated Polymer Blends, Copolymers and Composites: Synthesis, Properties, and Applications” Ed. P. Saini, ISBN: 978-1-118-54949-0, WILEY-Scrivener Publisher’s.
3. Saini, P.; Kuila, T.; Saha, S.; **Murmu, N. C.** “Graphene and its nanocomposites for gas sensing applications” in “Advanced Sensor and Detection Materials” Ed. A. Tiwari and M. M. Demir, ISBN: 978-1-118-77348-2. Wiley, USA .
4. Chhetri, S.; Kuila, T.; **Murmu, N. C.** “Graphene Composites” In “Graphene Technology - From Laboratory to Fabrication”. Eds: Soroush Nazarpour and Stephen Waite. Publisher: Wiley-VCH Verlag GmbH & Co. KGaA, July 2016, ISBN: 978-3-527-33833-7.

### Popular Magazines

1. Abhiram Hens, P. Banerjee Tapas Kuila, **Murmu N. C.**, Nano-Patterning by Dip-Pen Nanolithography, Nano Digest, Sep, 2012, 29-30.
2. **Murmu, N. C.**, Sudipta De, Tapas Kuila, EHD Ink Jet Printing –Revelation in Nano Manufacturing, Sept, 2013, Nano Digest, 26-28.
3. P. Banerjee, **Murmu, N. C.**, Bio essential anions from solutions to nano materials, Nano Digest, NANO DIGEST, Nov, 2013, 24.

## Industry/DST Sponsored Projects

### [On-Going Projects]

- Design, Fabrication and Demonstration of Type-IV Hydrogen storage tank, safety valves and Leak Detectors, **CSIR Mission Project**, [CSIR-CGCRI, Kolkata & CSIR-NIIST, Trivandrum] (Rs. 747.28 Lakh) » **Project Coordinator & Principal Investigator**.
- Establishment of Science Technology & Innovation Hub for Sal Butter at Kanska Block, Paschim Bardhaman District, West Bengal (2022-25) DST, New Delhi (Rs. 62.85 Lacs ) » **Principal Investigator**.
- Design and development of graphene reinforced carbon fiber/epoxy composite based light weight high pressure hydrogen storage cylinder for vehicular application (2020-23), **DST**, New Delhi (Rs. 76.68 Lacs ) with IIT Kanpur » **Principal Investigator**.
- Fabrication of high energy density supercapacitor pouch cell using chemically derived meso-porous graphene-based composite materials (2021-24), **DST**, New Delhi (Rs. 19.08 Lacs ) » **Principal Investigator**.
- Renewable Energy EMPOWERING European and InDIan Communities ("RE-EMPOWERED")" (2021-24), **Indo-European Project** (Project Value: Rs. 903 lakhs, CMERI: Rs. 156.85 lakhs) » **Co-Principal Investigator**.
- Design, development and prototyping of state of the art Hybrid Energy Storage System (HESS) based high power high speed Electric Vehicle (EV) drive train for a Multi Utility Vehicle (MUV) (2019-22), **DST**, New Delhi (Rs. 144.452 Lacs for consortium) with NIT-Roukela » **Co-Principal Investigator**.

### [Completed Projects]

- Graphene Ultra Capacitor Module for Hybrid Unmanned Ground Vehicles (UGV) (2017-20), **DRDO**, New Delhi, (Rs. 489 Lacs)» **Principal Investigator**.
- Design and development of Hollow Crankshaft for Automobile (2014-17) **Indo-German Science and Technology Centre (IGSTC)** [Bharat Forge Ltd, Fraunhofer Institute, Germany, Siedel, GmbH, Germany] (Rs.600 Lakh for consortium) » **Principal Investigator**.
- Design and development of Electrohydrodynamic Ink Jet Printing System,(2016-2019), **DST**, New Delhi, (Rs 116 Lacs) with NIT-Durgapur » **Principal Investigator**.
- Design and development of Multi-Material Deposition (MMD) System (2013-17) **DST**, New Delhi, (Rs. 471.52 Lakh). » **Co-Principal Investigator**.
- Developing Manufacturing Technology of Graphene-based Polymer Composite for Mechanically Stable and Thermally Durable Automotive Component, (2017-20209), **DST**, New Delhi (Rs. 30.56 Lacs ) » **Principal Investigator**.
- Surface coating of nylon and stainless steel using graphene-based composite materials (2014-15), **Chonbuk National University, South Korea** (Rs.11 Lakh). » **Co-Principal Investigator**.
- Measuring Progression of Wear in Wire Drawing Process using Acoustic Emission technique (2011-13), **TATA STEEL Jamshedpur** (Rs.14.72 Lakh). »**Principal Investigator**.
- Preliminary Investigation of Graphene-Based Die Lubricants for Hot Forging Application(2014-15), **SONA BLW PRECISION FORGINGS**, (Rs 15 Lakhs) » **Principal Investigator**.
- Investigation of degradation ofhydraulic oil in Hydraulic Power Steering(2014-15) **SONA KOYO STEERING**, (Rs 16.44 Lakhs) » **Co-Principal Investigator**.
- Development of Rolling Element Bearing Testing Stands (2003-05) **TATA BEARINGS & DST**, New Delhi (Rs 39.875 Lakhs). » **Principal Investigator**.
- Acoustic emission based online wireless wear monitoring system (2017-21) **DST**, New Delhi, (Rs. 23.4 Lakh). » **Co-Principal Investigator**.

## **CSIR-Network Project as Principal Investigator**

### **[On-Going Projects]**

- Development of Compressed Hydrogen Composite Storage Tank for Fuel Cell Electric Vehicles (2020-23) **CSIR Niche Creating Project** (Rs.200 Lakh) » **Principal Investigator.**
- Development of Ultra-Precision Co-ordinate Measuring Machine(UCMM) with sub-micron range uncertainty (2020-23) **CSIR Niche Creating Project** (Rs.277 Lakh) » **Co-Principal Investigator.**
- Development of Scanning Laser Epitaxy (SLE) Process, (2020-23) **CSIR Focus Basic Research Project** (Rs.50 Lakh) » **Co-Principal Investigator.**

### **[Completed Projects]**

- Graphene based Aqueous Lubricants (2016-18) **CSIR Fast Track Translation Research Project**, New Delhi (Rs 119.64 Lakhs). » **Principal Investigator.**
- Graphene-Based Rechargeable Energy Storage Micro Device (2013-17) **CSIR-Network Project**, (Rs.182 Lakh) » **Principal Investigator.**
- Micro/Nano-Scale Surface Patterning (2013-17) **CSIR –Network Project**, (Rs.282 Lakh) » **Principal Investigator.**
- Electro-Hydrodynamic Jet Printing System (2013-17) **CSIR-Network Project CSIR-Network Project**, (Rs.119 Lakh) » **Principal Investigator.**
- $\mu$ -Actuator of Magnetic-Fluid Enabled Deformable Mirror for Retinal Imaging Adaptive Optics Systems (2012-17) **CSIR –Network Project**, (Rs.108 Lakh) » **Principal Investigator.**
- Multi-Material Reconfigurable Micro Manufacturing Systems – (Task3)(2007-12) **CSIR –Network Project**, (Rs.312 Lakh) » **Principal Investigator.**
- Preliminary Investigation of Dip Pen Nanolithography (2012-16) **CSIR –CMERI Project**, (Rs. 67.85 Lakh)» **Principal Investigator.**
- Development of Rolling Element Bearing Standards for Aerospace Applications (2004-08) **CSIR -Network Project**, (Rs. 61 Lakh) » **Principal Investigator.**
- Magnetic Journal Bearing For Miniaturized/ Micro Devices (2013-17) **CSIR-Network Project CSIR –Network Project**, (Rs.179 Lakh) » **Co-Principal Investigator.**
- Tunable Nanolubrication with nanofluids for meso-micro mechanical system (2013-17) **CSIR-Network Project CSIR –Network Project**, (Rs.169 Lakh) » **Co-Principal Investigator.**
- Developmental Studies of 5kW Gas Turbine-Compressor Set (2011-14) **CSIR-CMERI Project** (Rs.19.96 Lakh) » **Co-Principal Investigator.**
- Preliminary Investigation on Foil Bearing Development (2011-14) **CSIR-CMERI** (Rs. 25Lakh) » **Co-Principal Investigator.**
- Investigation of Wear at Tribological Interfaces Characterizing in terms of Acoustic Emission Signals For Possible Application (2011-13) **CSIR-CMERI Project**, (Rs.19.30) » **Co-Principal Investigator.**
- Evaluation of Tribological and Mechanical Properties of Supper Hard Materials for Strategic Engineering Applications. (2002-07) **CSIR-Network Project CSIR –Network Project**, (Rs.66Lakh) » **Co-Principal Investigator.**

### **Key achievements as Team Leader**

- **5kW Micro Turbine** (*demonstrated @40,000rpm*)
- **5 Axis Micro-Milling Machine** (*demonstrated milling 100 $\mu$ m feature*).
- **Graphene Super-Capacitor** (*~113W/Kg at device level*).
- **Foil Bearing** (*demonstrated at 30,000rpm*)
- **EHD-Ink Jet Printing**
- **Graphene Lubricant** (*cof ~0.01*) for hot forging.
- **Miniature Turbine** (*demonstrated @2.73 Lakh rpm*).
- **Graphene Nano-composite** (*UTS ~46% improvement*)
- **Die Wear Monitoring System** (*successfully tested at TATA Steel, Jamshedpur*).

### **PhD Completed as Supervisor/Co-Supervisor**

1. Dr. Milan Jana, “Development of Graphene based Electrode Materials for Electrochemical Supercapacitor”, January, 2018, (10CC13A12010) jointly with Dr. Tapas Kuila.
2. Dr. Sanjit Saha, “Investigation of the effect of heterostructure and doping of semiconductor materials for high energy density Supercapacitor application”, May 2018 (20EE15J12001) jointly with Dr. T Kuila.
3. Dr. Suman Chhetri, “Development of functionalized Graphen/Epoxy composites for the improvement of mechanical, anti-corrosion and EMI shielding Properties”, September 2019, (10CC15A12006) jointly with Dr. T Kuila.
4. Dr. J Sharath Kumar, “Development of Graphene based Electrochemical sensor materials for detection of hydrogen peroxide(H<sub>2</sub>O<sub>2</sub>), October, 2019, (10CC15A12007) jointly with Dr. T Kuila.
5. Dr. Phani Kumar Mallisetty, “Investigation of externally pressurized multilayer porous journal bearings”, 2019 jointly with Dr. Pranab Samanta.
6. Dr. Amit Kumar Ball (NIT, Durgapur) “Experimental investigation and computational modeling of the Electrohydrodynamic Ink Jet Printing System” – Amit Kumar Ball (NITD/PHD/CS/2016/00751) jointly with Dr. S.S. Roy and Dr.D. R. Kisku
7. Dr. Subhasis Shit, (AcSIR) “Development of noble-metal-free efficient bifunctional electrocatalysis for overall water splitting in alkaline medium” –April, 2022(10CC18A12016), jointly with Dr. Tapas Kuila.
8. Dr. Manilal Murmu, “Design, synthesis and ccharacterization of organic molecules for corrosion inhibition of metals: Application of anti-corrosive additives coating materials’, –December 2021(10CC16J12005) jointly with Dr. Priyabrata Banerjee.
9. Dr. Suparna Paul, “Development of Sensory probes for expeditious chomo-fluorogenic detection of heavy, toxic cataonic cataminants and lethal anions: Detailed Characterization and Applications’, – February 2022(10CC16A12004) jointly with Dr. Priyabrata Banerjee.
10. Dr. SouravBej, “Design and Synthesis of Supramolecular assembly as sensory reactor for detection of neutral and lethal anionic contaminants” – March 2022 (10CC18A12013) jointly with Dr. Priyabrata Banerjee.
11. Dr. Debanjan Dey, “Development of Schiff base based organic framework/polymers as solvent materials for water immiscible oil and toxic organic solvent cleaner and small molecules for detection of water mischible toxins” – April 2022 (10CC16A12002) jointly with Dr. Priyabrata Banerjee.

### PhD Scholars under Joint Supervision- On-Going

1. Mr. Souvik Ghosh EN of AcSIR:10CC19J12001
2. Ms. Abhijit Hazra EN of AcSIR:10CC18J12004
3. Ms. Riyanka Das EN of AcSIR:10CC18A12014
4. Mr. Simeon Babalola EN of AcSIR: 20EE20J12015

### Post Graduation(MTech/MCA) as Supervisor

- 1) Ms. Puja Ghosal, MTech (NIT Durgapur) 2017
- 2) Mr. Pratikkumar Raje, PGRP(AcSIR) 2014
- 3) Mr. Nagendra Singh, MTech (NIT Durgapur) 2014
- 4) Mr. RudraBubai Sarkar, MTech (IIT-BHU) 2013
- 5) Md. Rehman N, MTech (NIT Durgapur) 2012
- 6) Dr. Ehteshan Hassan, MTech (NIT Durgapur) 2011
- 7) Mr. Pankaj Kumar Singh, IIT(ISM) 2010
- 8) Ms. Sandipa Bhattacharya, MCA, MID, Durgapur, 2010
- 9) Ms. Bhavna Saxena, MCA, Banasthali University, 2010
- 10) Ms. Moumita Banik, MCA, Banasthali University, 2010
- 11) Mr. Ritwik Mondal, MTech (NIT Durgapur) 2010
- 12) Ms. Sushmita Sarkar, MCA (Banasthali University) 2009
- 13) Dr. Ravi Shankar Anand, M. Tech (BIT, Mesra) 2008
- 14) Dr. Deepak Kumar, M. Tech (BIT, Mesra) 2008
- 15) Dr. Mou Dasgupta, MCA(WBUT) 2007
- 16) Mr. Ritesh K. Koshti, M. Tech (IIT-BHU) 2006
- 17) Mr. Anupam Sen, MTech (NIT Durgapur) 2005

### Invited Lecture

- **Murmu, N. C.**, Nanolubricants dispersed with graphene and its derivatives: an assessment and review of the tribological performance – *International virtual Conference on Tribology*, December 10-12, 2020, SRM University and Tribology Society of India.
- **Murmu, N. C.**, Graphene-Based Aqueous Lubricant for Hot Forging Application, *International conference Synthesis, Characterization and Application of Nanomaterials (SCAN)*, November 1-2, 2019, by Material Research Society, Kolkata.
- **Murmu, N. C.**, Functionalized Graphene & some of its Applications – R&D @ CSIR-CMERI, *32nd National Convention of Metallurgical and Materials Engineers & National Seminar on Advances in Engineering Materials for Sustainable Development*, January 18-19, 2019, CSIR-NML, Jamshedpur

- **Murmu, N. C.**, Metal Additive Manufacturing – Developing Affordable and Accessible System, *Indo-German Bilateral Workshop on Additive Manufacturing of Metals: Current Issues and way forward.*, February 04-06, 2019, NML, Jamshedpur
- **Murmu, N. C.**, Electro-Hydrodynamic Inkjet for Manufacturing of  $\mu$ -Patterns Prototype Dev. And Preliminary Investigations, *International Symposium on Aspects of Mechanical Engineering & Technology for Industry*, 6-8 Dec, 2014, NERIST, Itanagar, india.
- **Murmu, N. C.**, Preliminary Studies on Dip Pen Nanolithography, *Indo-US Workshop on Fabronics*, 23-24 Dec, 2012, CSIR-CMERI, Durgapur, India.
- **Murmu, N. C.**, "Interoperability of CAD Data Translation- Current Solutions and their issue." The Short term Course on "Design and Engineering (CADE-2014)" 06-10 January, 2014; National Institute of Technology, Durgapur.

\*\*\*\*\*