ANINDYA BASU

Anindya Basu is currently working as Dean (Faculty Welfare) of the National Institute of Technology and a Professor in the Department of Metallurgical and Materials Engineering at the National Institute of Technology, Rourkela, India. Prof. Basu's current research interests are Physical Metallurgy and Surface Engineering. He has seventeen years of academic experience. Earlier, he had five years of industrial experience in the field of heat treatment in the automobile sector.

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Professional Qualifications:

Bachelor Degree (B. E.) in Metallurgical Engineering from Bengal Engineering College (Calcutta University, Calcutta). **(1995)**
Master Degree (M. Tech) in Metallurgical and Materials Engineering from Indian Institute of Technology, Kharagpur. (**1997)**
Ph.D. In Metallurgical and Materials Engineering from Indian Institute of Technology, Kharagpur. **(2007)**
(Title: Surface Engineering of SAE 52100 Steel)

Scholarships: Government of India Merit Scholarship, GATE Fellowship during M.Tech and Ph. D Programme.

Work Experiences:

Senior Engineer, DAEWOO Motors India Limited, Noida (1997 – 2001)
Assistant Professor, National Institute of Foundry and Forge Technology, Ranchi (2007 – 2008)

National Institute of Technology, Rourkela (2008 – 2011)
Associate Professor, National Institute of Technology, Rourkela (2011 – 2020)
Professor, National Institute of Technology, Rourkela (2020 – till date)

Broad Research Interest:

Physical Metallurgy and Surface Engineering.

Sponsored Projects:

1. Development of nano-dispersed fine-grained coating by electrodeposition, Department of Science and Technology, Government of India, **2009-2012. PI**

2. Surface property improvement of copper for electrical contacts by electrophoretic deposition of ultrafine ceramic particles, Council of Scientific and Industrial Research, Government of India, **2011-2015**. **PI**

3. Investigation of solidification process and prediction of microstructure during secondary cooling in continuous casting of plain carbon steel to estimate the porosity fraction and carbon segregated by multi-scale simulation (cellular automata and phase-field modeling techniques), Department of Science and Technology, Government of India (Indo-Belarus initiative), **2017-2019. Co-PI.**

4. Oxidation and corrosion property improvement by pulsed electro-co-deposited composite coating, Council of Scientific and Industrial Research, Government of India, **2017-2020. PI.**

5. Development of electrodeposition and ultrasonic shot peening based hybrid technique for nano ceramic dispersed metallic coating, Core research grand by Science and Engineering Research Board (SERB), India, **2019-2022. PI.**

Consultancy Projects:

1. Corrosion of Pipelines of mixed gas service in RSP, RSP-SAIL, India, **2019-2020. Co-PI.**
2. Designing and evaluation of novel hybrid MMC coating system for improved anti-corrosion and mechanical properties, TATA Steel Limited, Jamshedpur, India. **2020-2022. PI.**

Journal publications:

1. Sivasubramanian. J, Pundrikaksha Upadhyay, Archana Mallik and A. Basu, "*Electrochemical corrosion behaviour of electrodeposited nickel coating subjected to ultrasonic shot peening treatment*", ", Surface & Coatings Technology, 503 (2025) 132005
2. Adarsh Kushwaha, Sivasubramanian J., M. D. Aseef Khan, Manoj Masanta and **A. Basu**, "*Ultrasonic shot peening (USSP) post-treatment of Ni laser cladding on mild steel*", Materials Today Communications, 41 (2024) 111076.
3. Sudhir Behera, Ibrahim A. Alnaser, Gorti Janardhan, Pushpendra Kumar Dwivedi, Jayaprakash Murugesan, **Anindya Basu**, Asiful H. Seikh, and Krishna Dutta, "*Effect of Ultrasonic Shot Peening on Surface Mechanical and Wear Behavior of Aluminum 7075-T651 Alloy*", Journal of Materials Engineering and Performance, (2024).
4. Adarsh Kushwaha and **A. Basu**, *"Development of galvanic pulse deposited and ultrasonic shot peening (USSP) based Ni-Cr hybrid coatings*", Journal of Materials Engineering and Performance, (2024).
5. D. Narsimhachary, Avala Lavakumar, Prvan Kumar Katiyar, S.M. Shariff, and **A. Basu**, "*Effect of wire deposition rate on macro and microscopic characteristics of laser weld-brazed AA5083 aluminum alloy to*

galvanized steel joints and their corrosion response", Advances In Materials and Processing Technologies, (2024),

6. J. Sivasubramanian and **A. Basu**, "*Modification of microstructural and surface-mechanical properties of nickel-coated copper by ultrasonic shot peening with emphasis on scratch response"*, Metallurgical and Materials Transactions A, (2024).
7. Bhargavi Rani Anne, Shajahan Shaik, **Anindya Basu**, V S M Ramakrishna, "*Review on Electrodeposited Ni–W Based Composite Coatings in High-Temperature Applications Concerning Oxidation Behavior*", Metals and Materials International, 30 (2024) 1441-1458.
8. Meeta Ashok Kamde, Yogendra Mahton, Ankit Kumar, N Surya Prakash, Mangal Roy, **Anindya Basu**, Partha Saha, *"Effect of phosphate post-treatment on corrosion behavior of cerium-based conversion coated Mg-4.0Y-4.0Zn-0.5Zr-0.2Ca (wt.%) alloys*", Materials Chemistry and Physics, 314 (2024) 128843.
9. Meeta Ashok Kamde, Yogendra Mahton, Adarsh Kushwaha, **Anindya Basu**, Partha Saha, "*Effect of ultrasonic shot peening and intermediate cerium salt conversion bath treatment controlling corrosion of Mg-Y-Zn-based alloy in salt water*", Applied Surface Science, 648 (2024) 159094.
10. Shajahan Shaik, Adarsh Kushwaha, **Anindya Basu**,"*Oxidation study of multiple dissimilar nanoparticles reinforced Ni-W alloy matrix coating*", Journal of Materials Engineering and Performance, (2023).
11. Pushpendra Kumar Dwivedi, Chinnam Sivateja, Arun Kumar Rai, P. Ganesh, **Anindya Basu**, Krishna Dutta, "*A comparative assessment of the effects of laser shock peening and ultrasonic shot peening on surface integrity and ratcheting fatigue performance of HSLA steel*", International Journal of Fatigue, 176 (2023) 107902.
12. Pundrikaksha Upadhyay, Anushri Nag, Atanu Banerjee, **Anindya Basu**, Sanjeev Das, Archana Mallik, "*A Comparative Study of Pulse and DC Electroplating of Zn onto Mild Steel for Improved Corrosion Resistance*", Trans. IIM, 77 (2024) 1393-1405.
13. Bhavyan Sahayata, Sattwik Kumar Mahanta, Pundrikaksha Upadhyay, Rajath R Mendon, **Anindya Basu**, Sanjeev Das and Archana Mallik, "*An approach to improve corrosion resistance in electro-galvanized Zn-Al composite coating by induced passivity"*, Materials Letters, 351 (2023) 135013.
14. Sourav Ganguly, A. K. Chaubey, Rahul Gope, Adarsh Kushwaha, **Anindya Basu** and Manoj Gupta, "*Enhanced corrosion performance of ultrasonically shot peened and graphene nanoparticles reinforced squeeze-cast AZ91 magnesium alloy*", Journal of Alloys and Compounds, 966 (2023) 171203.
15. P. Janardhana Kiran, V. Srinivas, **A. Basu**, Corinne Nouveau and K. Ram Mohan Rao, "*Elevated Temperature Plasma Nitriding of CrMoV Tool Steel for the Enhancement of Hardness and Wear Resistance*", Journal of Materials Engineering and Performance, , 32 (2023) 9540-9549.
16. Adarsh Kushwaha and **A. Basu**, "*Effect of Peening Parameters on the Ultrasonic Shot-Peened Surfaces of Electro-co-deposited Ni/Ni-TiO_2 Coatings*", Journal of Materials Engineering and Performance, 32 (2023) 9525-9539.
17. Sourav Ganguly, A.K. Chaubey, Rajakishore Sahoo, Adarsh Kushwaha, **Anindya Basu**, Jichil Majhi, Manoj Gupta, "*Influence of ultrasonic shot peening on the microstructure and impression creep performance of squeeze-cast AZ91 alloy reinforced with graphene nanoplatelets*", Journal of Alloys and Compounds, 938 (2023) 168640.
18. Jichil Majhi, A.K. Mondal, **A. Basu**, Hajo Dieringa, S. Kumar "*Influence of Ca+Bi on tensile and strain hardening behaviour of AZ91 alloy*", Materials Science and Technology, 38 (2022) 377–389.
19. Shajahan Shaik, **A. Basu, "***Effect of multiple dissimilar nanoparticles in Ni–W alloy matrix composite coating and evaluation of surface-mechanical, corrosion, and hydrophobic properties",* Journal of Materials Chemistry and Physics, 278 (2022) 125585.
20. Jichil Majhi, Sourav Ganguly, **A. Basu**, A. K. Mondal, "*Improved corrosion response of squeeze-cast AZ91 magnesium alloy with Calcium and Bismuth additions*", Journal of Alloys and Compounds, 873 (2021) 159600.
21. Bhargavi Rani Anne, Shajahan Shaik, Masaki Tanaka, **Anindya Basu**, "*A crucial review on recent updates of oxidation behavior in high entropy alloys*", S N Applied Sciences, 3 (2021) 336.

22. Bharath Kumar Yadlapalli, H. S. Maharana, **A. Basu**, "*Structure and properties of pulse electrodeposited Cr-WC coating*", Surface Topography: Metrology and Properties, 8 (2020) 025023.
23. Shaik Shajahan, **A. Basu**, "*Corrosion, oxidation and wear study of electro-co-deposited ZrO2-TiO2 reinforced Ni-W coatings*", Surface and Coatings Technology, 393 (2020) 125729.
24. Mahesh Kumar Kolle, Shaik Shajahan, **A. Basu**, "*Effect of Electrodeposition Current and Pulse Parameter on Surface-Mechanical and Electrochemical Behavior of Ni-W Alloy Coatings*", Metallurgical and Materials Transactions A, 51 (2020) 3721-3731.
25. Jichil Majhi, Tanmoy Das, **A. Basu**, A. K. Mondal "*An analysis of microstructure and impression creep response of squeeze-cast AZ91–xBi–ySr alloys*", Materials Science and Technology, 36(9) (2020) 731–742.
26. Sourav Ganguly, A. K. Mondal, Smarajit Sarkar, A. Basu, S. Kumar, and Carsten Blawert, "*Improved corrosion response of squeeze-cast SiC nanoparticles reinforced AZ91-2.0Ca-0.3Sb alloy*", Corrosion Science, 166 (2020) 108444
27. Shaik Shajahan, Anil Kumar, Manoj Chopkar, **A. Basu**, *"Oxidation study of CoCrCuFeNiSix high entropy alloys"*, Materials Research Express, 7 (2020) 016532.
28. Shaik Shajahan, **Anindya Basu,** "*Effect of current density and deposition time on the corrosion and wear resistance of Ni¬W alloy coatings*", International Journal of Materials Research, 110, 12 (2019). 1160-1167.
29. Anil Kumar, Digvijay Parganiham, Jagesvar Verma, Prasenjit Biswas, **A. Basu**, Manoj Chopkar, "*On the synthesis and characterization of novel composite structured high entropy alloys*", Philosophical Magazine Letters, 2019, 99 (2019) 302-308.
30. H. S. Maharana, **A. Basu**, K. Mondal, "*Effect of CTAB on the architecture and hydrophobicity of electrodeposited Cu–ZrO_2 nano-cone arrays",* Surface & Coatings Technology, 375 (2019) 323-333.
31. D. Narsimhachary, P.K. Rai, S. M. Shariff, G. Padmanabham, K. Mondal, **A. Basu**, "*Corrosion behavior of laser-brazed surface made by joining of AA6082 and galvanized steel*", Journal of Materials Engineering and Performance, 28 (2019) 2115-2127.
32. D. Narsimhachary, S. M. Shariff, G. Padmanabham, **A. Basu**, "*Influence of wire feed rate on mechanical and microstructure characteristics of aluminum to galvanized steel laser brazed joint*", Journal of Manufacturing Processes, 39 (2019) 271-281
33. H. S. Maharana, B. Bishoyi, **A. Basu,** "*Current density dependent microstructure and texture evolution and related effects on properties of electrodeposited Ni-Al coating*" Journal of Alloys and Compounds, 787 (2019) 483-494.
34. D. Narsimhachary, K. Dutta, S. M. Sharif, G. Padmanabham, **A. Basu**, "*Mechanical and microstructural characterization of laser weld-brazed AA6082-galvanized steel joint*", Journal of Materials Processing Technology, 263 (2019) 21-32.
35. 28. H. S. Maharana, **A. Basu**, "*Effects of Different Surfactants on Structural, Tribological and Electrical Properties of Pulsed Electro-Codeposited Cu-ZrO_2 Composite Coatings*", Journal of Materials Engineering and Performance, 27 (2018) *1854–1865*
36. H. S. Maharana, B. Bishoyi, S. Panda, **A. Basu**, "*Electron backscattered diffraction study of pulse electrodeposited Cu-Y_2O_3 composite coating*", Journal of Materials Engineering and Performance, 27(7) (2018) 3488-3497.
37. H. S. Maharana, **A. Basu**, K. Mondal, "*Structural and tribological correlation of electrodeposited solid lubricating Ni-WSe_2 composite coating*", Surface & Coatings Technology, 349 (2018) 328-339.
38. H.S. Maharana, S. Jena, **A. Basu**, K. Mondal, "*High temperature oxidation resistance of electrodeposited Reduced Graphene Oxide (RGO) reinforced copper coating*", Surface & Coatings Technology, 345 (2018) 140–151.
39. Anil Kumar, Akhilesh Kumar Swarnakar, **A. Basu**, Manoj Chopkar, "*Effects of processing route on phase evolution and mechanical properties of CoCrCuFeNiSix high entropy alloys"*, Journal of Alloys and Compounds, 748 (2018) 889-897.

40. H. S. Maharana, S. Bhatnagar, **A. Basu**, "*Structure property correlation of electro-codeposited Cu-Al-V_2O_5 composite coating obtained from Al-V_2O_5 dispersed electrolyte",* Surface and Coating Technologies, 339 (2018) 111-123.
41. Mohan Nuthalapati, S.K. Karak, D. Chakravarty, **A. Basu**, "*Comparative Study on Microscopic, Physical and Mechanical properties of Conventional and Spark Plasma Sintered Nano-TiO_2 Dispersed Zirconium Base Alloys*", Metallography, Microstructure, and Analysis, 6 (2017) 527–540.
42. D. Narsimhachary, S. Pal, S. M. Shariff, G. Padmanabham, **A. Basu** "*AA6082 to DX56-steel Laser-brazing: process parameter - intermetallic formation correlation*", Journal of Materials Engineering and Performance, 26 (2017) 4274-4281.
43. H. S. Maharana, S. Panda, **A. Basu,** "*Effect of texture and microstructure on properties of electrodeposited Cu-SiO_2 and Cu-Y_2O_3 coatings*", Surface and Coating Technologies, 315 (2017) 558-566.
44. H. S. Maharana, **A. Basu**, "*Evolution and structure-property correlation of CTAB assisted high hardness electrodeposited Cu-ZrO_2 nano-cone arrays*", Surface and Coating Technologies, 310 (2017) 148–156.
45. H. S. Maharana, P. K. Rai, **A. Basu**, "*Surface-mechanical and electrical properties of pulse electrodeposited Cu–graphene oxide composite coating for electrical contacts*", Journal of Materials Science, 52 (2017) 1089–1105
46. Mohan Nuthalapati, S.K. Karak, J. Dutta Majumdar, D. Chakravarty, **A. Basu**, "*Corrosion behavior and high temperature oxidation kinetics of nano-TiO_2/Y_2O_3 dispersed zirconium alloys*", Journal of Alloys and Compounds, 689 (2016) 908-917.
47. H. S. Maharana, **A. Basu,** "*Surface-mechanical and oxidation behavior of electro-co-deposited Cu-Y_2O_3 composite coating*", Surface and Coating Technologies, 304 (2016) 348–358.
48. Suprabha Lakra, H. S. Maharana, **A. Basu** "*Synthesis and characterization of Cr-ZrO_2 composite coating formed by DC and pulse electrodeposition*", Materials and Manufacturing Processes, 31(11) (2016) 1447-1453.
49. H. S. Maharana, Suprabha Lakra, S. Pal, **A. Basu**, "*Electrophoretic deposition of Cu-SiO_2 coatings by DC and pulsed DC for enhanced surface mechanical properties*", Journal of Materials Engineering and Performance, 25 (2016) 327-337.
50. H. S. Maharana, Akarapu Ashok, S. Pal, **A. Basu**, "*Surface-mechanical properties of electrodeposited Cu-Al_2O_3 composite coating and effects of processing parameters*", Metallurgical and Materials Transactions A, 47 (2016) 388-399.
51. M. Nuthalapati, S. K. Karak, D. Chakravarty, **A. Basu**, "*Development of nano-Y_2O_3 dispersed Zr alloys by mechanical alloying and spark plasma sintering*" Materials Science and Engineering A, 650 (2016) 145-153.
52. Prem Prakash Seth, A. Das, H. N. Bar, S. Sivaprasad, **A. Basu** (communicating author) and K. Dutta, "*Evolution of dislocation density during tensile deformation of BH220 steel at different pre-strain conditions*", Journal of Materials Engineering and Performance, 24 (2015) 2779-2783.
53. D. Narsimhachary, Ravi.N.Bathe, J. Dutta Majumdar, Padmanabham.G, **A. Basu**, "*Microstructure and Mechanical Properties of Double Pass Laser Welds on Aluminium Alloy 6061 T6*", Lasers in Engineering, 33(1-3) (2016) 53-66.
54. Akarapu Ashok, H. S. Maharana and **A. Basu**,"*Effect of electro-co-deposition parameters on surface mechanical properties of Cu-TiO_2 composite coating*", Bulletin of Materials Science, 38(2) (2015) 335-342.
55. D. Narsimhachary, R. N. Bathe, G. Padmanabham, **A. Basu**, "*Influence of Temperature Profile during Laser Welding of Aluminium Alloy 6061 T6 on Microstructure and Mechanical Properties"*, Materials and Manufacturing Processes", Materials and Manufacturing Processes, 29 (2014) 948-953.
56. Mohan Nuthalapati, S. K. Karak, J. Dutta Majumdar, **A. Basu**, "*Phase Evolution and Mechanical Properties of Nano-TiO_2 Dispersed Zr-Based Alloys by Mechanical Alloying and Conventional Sintering*", Metallurgical and Materials Transactions A, 45 (2014) 3748-3754.
57. G. Parida, D. Chaira, **A. Basu**, "*Ni-ZrO_2 Composite Coating by Electro-co-deposition*", Trans. IIM 66(1) (2013) 5-11.

58. D. Roy, O.A.Ojo, H. Raghuvanshi and **A. Basu**, "*Fretting Wear Behavior of Nano-Intermetallic Precipitates Al65Cu20Ti15 Amorphous Matrix Composite Prepared by Pulse Plasma Sintering of the Ball Milled Powder*", Journal of Material Sciences & Engineering, 2012, http://dx.doi.org/10.4172/jme.1000107.
59. **A. Basu**, J. Dutta Majumdar, I. Manna, "*Structure and Properties of Cr_xN Coating*", Surface Engineering, 28 (2012) 199-204.
60. G. Parida, D. Chaira, M. Chopkar, **A. Basu**, "*Synthesis and characterization of Ni-TiO_2 composite coatings by electro-co-deposition*'", Surface and Coatings Technology, 205 (2011) 4871-4879.
61. **A. Basu**, J. Dutta Majumdar, J. Alphonsa, S. Mukherjee, I. Manna, "*Corrosion resistance improvement of high carbon low alloy steel by plasma based nitriding*", Materials Letters, 62 (2008) 3117–3120.
62. **A. Basu**, A. N. Samant, S. P. Harimkar, J. Dutta Majumdar, I. Manna, Narendra B. Dahotre, "*Laser surface coating of Fe-Cr-Mo-Y-B-C bulk metallic composition on AISI 4140 steel*", Surface and Coatings Technology, 202 (2008) 2623–2631.
63. **A. Basu**, J. Dutta Majumdar, J. Alphonsa, S. Mukherjee, I. Manna, "*Plasma nitriding of a low alloy - high carbon steel*", Trans. IIM, 60, 5 (2007) 1-9.
64. **A. Basu**, J. Dutta Majumdar, S. Ghosh Chowdhury, P. K. Ajikumar, P. Shankar, A. K. Tyagi, Baldev Raj and I. Manna, "*Microstructural and texture studies of gas nitrided Cr-coated low alloy high carbon steel*", Surface and Coatings Technology, 201 (2007) 6985-6992.
65. **A. Basu**, J. Chakraborty, S. M. Shariff, G. Padmanabham, S. Joshi, G. Sundararajan, J. Dutta Majumdar, I. Manna, "*Laser surface hardening of austempered (bainitic) ball bearing steel*", Scripta Materialia, 56 (2007) 887-890.

Conference Proceedings:

1. Sodanapalli Rehaman, Adarsh Kushwaha, **A. Basu**, "Effect of ultrasonic shot peening on electrodeposited Ni and Cu coatings on Cu substrate*"* ICPCM-2023, December 9-11, 2022, Rourkela, Materials Today: Proceedings, 91 (2023) 95–102.
2. Nehaar S. Bisen, J. Sivasubramanian, **A. Basu**, "*Ultrasonic shot peening of 316L stainless steel – Experimental and analytical approach"* ICPCM-2023, December 9-11, 2022, Rourkela, Materials Today: Proceedings, 91 (2023) 1-8.
3. Pundrikaksha Upadhyay, Sanjeev Das, **Anindya Basu**, Archana Mallik, "*Electroplating of Zn at different current densities onto mild steel for improved corrosion resistance*", ICAMP-2022, January 8-9, 2022, Raipur, Materials Today: Proceedings, , 66 (2022) 627-632.
4. Rakesh Kumar Swain, Pundrikaksha Upadhyay, Anushri Nag, Atanu Banerjee, A.N. Bhagat, **Anindya Basu**, Archana Mallik, "*Electro-galvanization of zinc and zinc-nickel onto mild steel for improved corrosion resistance*", ICPCM-2021, December 7-8, 2021, Rourkela, Materials Today: Proceedings, 62 (2022) 6257–6264.
5. D. Narsimhachary S. M. Shariff, S. Pal, G. Padmanabham, **A. Basu**, "*Influence of joint configuration on mechanical properties of laser weld-brazed aluminum to steel joint*", ICPCM-2018, December 12-14, 2018, Rourkela, Materials Science Forum, 978 (2020) 174-180.
6. Sripooja Mishra, Manaswini Chinara, Mohan Nuthalapati, **A. Basu**, "*Improvement of thermal properties of water and ethylene glycol by metallic and ceramic dispersion*", NCPCM-2015, December 11-12, 2015, Rourkela, Published in IOP Conf. Series: Materials Science and Engineering: 115 (2016) 012033,
7. Mohan Nuthalapati, S. K. Karak, **A. Basu**, "*Synthesis and characterization of nano-Y_2O_3 dispersed Zr-based alloys by mechanical alloying and conventional sintering",* ICMPC 2015, March 14-15, 2015, Hyderabad, Published in Materials Today: Proceedings 2 (2015) 1109 – 1117.
8. H. S. Maharana and **A. Basu**, "*Cu-SiO_2 nanocomposite coatings on Cu substrate by direct and pulsed direct current electro-co-deposition*", ICONEST 2014, August 7-9, 2014, Bangaluru.
9. D. Narsimha Chary, Ravi.N.Bathe, Basu.A, Padmanabham.G, "*Effect of Shielding on Autogenous Laser Welding of Aluminum Alloy 6061-T6*", International Welding Symposium, October 30 – November 1, 2012, Mumbai, 193-202.
10. G. Parida, D. Chaira, A. Basu, "Ultra fine TiO_2 dispersed metallic coating on steel", ICON – 2010, March 05-06, 2010, Coimbatore, 228-233.

11. **A. Basu** and I. Manna, "*Surface property modification of AISI 52100 steel by formation of ultrafine nitrides*", National Seminar on Advances in Materials Technology (NSAMT-09), March 5-6, Ranchi, 8-13.
12. **A. Basu** and I. Manna, "*Improvement of surface mechanical and corrosion properties of low carbon – high carbon steel by formation of ultrafine nitrides*", National Seminar on Advancement on nanotechnology in Physics, February 7-8, 2009, Rourkela, 66-70.
13. K. R. M. Rao, **A. Basu**, I. Chattoraj, A. K. Mallik, S. Mukherjee, S. K. Roy, J. Dutta Majumdar and I. Manna, "*Plasma immersion ion implantation of AISI 52100 ball bearing steel for the enhancement of hardness and corrosion resistance*", Proceedings of the International Convention on Surface Engineering, INCOSURF-2004, August 25-27, Bangalore, 421-426.

Book Chapter:

Archana Mallik and **A. Basu**, "*Metallurgy at the National Institute of Technology Rourkela—a Polished Ayas*" (chapter 28), inbook: Indian Metallurgy, the platinum years, Indian Institute of Metals Series, Springer, 2023, 109-117.

International Conferences (outside India):

1. Mohan Nuthalapati, S. K. Karak, **A Basu,** "*Comparative study of nano-TiO_2/Y_2O_3 dispersed zirconium based alloys by mechanical alloying and conventional sintering*", 4th Nano Today Conference, Dubai, 6-10 December, 2015.
2. Ashok Akarapu and **A. Basu**, "*Surface Property Modification of Copper by Nanocomposite Coating*", International Conference on Nanoscience and Technology (ICN+T 2012), Paris, 23-27 July, 2012.
3. G. Parida, D. Chaira and **A. Basu**, "*Synthesis and Characterization of Nano-TiO2 Dispersed Composite Coating by Electro-co-deposition*", International Conference on Materials for Advanced Technologies (ICMAT-2011), Singapore 26 Jun – 01 July, 2011.

Invited talks (offline talks outside own organization):

1. "Some Aspects of Surface Engineering to Counter Corrosion Attack" - in Advances in Corrosion Technology and Prevention (ACTP-2023) at IMMT, Bhubaneswar, 21 July, 2023.
2. Workshop on Materials Education, 5-7 March 2020, Coorg, Organized by IAS, IISc Banagalore and IIT Kanpur.
3. "Properties of composite coatings through electrodeposition and its applications" – TATA Steel R and D, 16 December, 2019.
4. "Composite coatings by electrodeposition" - centenary Lecture Series # 16 at IIT BHU by Department of Metallurgical Engineering, IIT BHU, The Metallurgy Society, IIT BHU and The Indian Institute of Metals, Varanasi Chapter and the Student Affiliate Chapter of IIM Varanasi, 4 April, 2019.
5. *"Surface engineering of metallic materials: Characterization and case studies*" in Advanced Techniques for Characterization and Optimization of Mechanical System (ATCOMS-2019) at VSSUT, Burla, 2-6 April, 2019.
6. "*Laser Surface Coating and Electrodeposition Method*" in Large Scale Dependent Materials Behavior (LSDMB - 2019) at VSSUT, Burla, 10-14 February, 2019.
7. *"Surface heat treatment of steels: conventional to modern trends and case studies"* in *Recent Trends in Iron and Steel making (RTISM)* by O. P. Jindal University, Raigarh, April 10-11, 2018.
8. "Some Aspects of Materials Education", NMD ATM 2016, IIT Kanpur, 14-16 November, 2016.
9. "Synthesis and characterization of pulsed electrodeposited Cu-Y_2O_3 coating", 4th International Conference on Advances in Materials and Materials Processing (ICAMMP 2016), IIT Kharagpur, 5-7 November, 2016.
10. "Effect of plasma nitriding on corrosion behavior of a high carbon low alloy steel", 3rd International Conference on Laser and Plasma Applications in Materials Science (LAPAMS 2015), by IIT Kharagpur at Kolkata, 15-17 January, 2015.

11. "*Application of x-ray diffraction in surface engineering*", in *X-Ray Diffraction and Its Application in Materials Engineering* organized by NIT Raipur, 2-3 August, 2014.
12. "S*urface engineering of steels: conventional to modern trends and case studies*" at TATA Steel R & D for TATA Steel Engineers, 23rd February, 2013.
13. "*Surface heat treatment of steels: conventional to modern trends and case studies*" in *National Workshop on Heat Treatment of Steels* organized by Indian Institute of Metals, Kolkata Chapter, 10-11 February, 2012.
14. "Laser Surface Engineering of High Carbon Low Alloy Steel" in National Symposium on Frontiers of Engineering (NatFOE 4) organized by IGCAR, Kalpakkam, 16-17 September, 2009.

Conference/workshop organized:

1. International Conference on Processing and Characterization of Materials (ICPCM 2022), held at NIT Rourkela on 9-11 December 2022 as Chairman.
2. SERB sponsored workshop on Mechanically Assisted Surface Treatment, held at NIT Rourkela on 28 – 29 June 2022 (virtual mode) as coordinator.
3. International Conference on Processing and Characterization of Materials (ICPCM 2021), held at NIT Rourkela on 7-8 December (virtual mode) 2021 as Chairman.
4. Conference on Processing and Characterization of Materials (CPCM 2020), held at NIT Rourkela on 18-20 December 2020 (virtual mode) as Chairman.
5. TEQIP – III sponsored workshop on Electroforming and Corrosion, held at NIT Rourkela on 24-28 September 2018 as Coordinator.
6. TEQIP – III Sponsored National WORKSHOP on Outcome-based accreditation of technical education held at NIT Rourkela on 18-19 August 2018 as Co-coordinator.
7. National Conference on Processing and Characterization of Materials (NCPCM 2016), held at NIT Rourkela on 9-10 December 2016 as Treasurer.
8. National Conference on Processing and Characterization of Materials (NCPCM 2014), held at NIT Rourkela on 5-6 December 2014 as Editorial Chief.
9. National Conference on Processing and Characterization of Materials (NCPCM 2013), held at NIT Rourkela on 6-7 December 2013 as Technical Committee member.
10. National Conference on Processing and Characterization of Materials (NCPCM 2012), held at NIT Rourkela on 7-8 December 2012 as Convener.
11. National Conference on Processing and Characterization of Materials (NCPCM 2011), held at NIT Rourkela on 2-3 December 2011 as Co-convener.
12. Materials Technology: Advanced Processes and Characterizations, held at NIT Rourkela on 10-11 December 2009 as Convener.
13. National Seminar cum Exhibition on Need for Vocational Education Training in Jharkhand, held at National Institute of Foundry and Forge Technology (NIFFT) on 9-10 September 2008 as Treasurer.
14. National Conference of Research Scholars on Metallurgical and Materials Engineering (CRSMSE-2003), held at Kharagpur on 30-31 August 2003 as Treasurer.

Journal Review:

1. Journal of Physics and Chemistry of Solids (Elsevier)
2. Thin solid films (Elsevier)
3. Materials Transaction A (Springer)
4. Surface Coatings and Technologies (Elsevier)
5. Bulletin of Materials Science (Springer)
6. International Journal of Materials Research (Hanser)
7. Journal of Alloys and Compounds (Elsevier)

8. Materials Chemistry and Physics (Elsevier)
9. Optics and Lasers in Engineering (Elsevier)
10. Nature Scientific Reports (Nature group)
11. Sadhana (Springer)
12. Tribology Transaction (Taylor and Francis)
13. Transaction of Indian Institute of Metals (Springer)
14. Lasers in Engineering (Old City Publishing)
15. Journal of Engineering Materials and Technology (ASME)
16. Journal of Materials Engineering and Performance (ASM)

Many more.

External Examiner of:

1. Ranchi University
2. Biju Pattnaik Technical University.
3. Indian Institute of Metals
4. Siksha 'O' Anusandhan University
5. Sambalpur University
6. Indian Institute of Metals
7. VSSUT Burla

Administrative post held:

1. Vice President, Literary and Cultural Society, Student Activity Centre (SAC), NIT Rourkela: 2010-2013.
2. Chairman, Summer Internship Program, NIT Rourkela: 2016, 17 and 18 summers.
3. Coordinator, Accreditation and Ranking Cell, NIT Rourkela: 2017 – 2020.
4. Head of the Department, Dept. of Metallurgical and Materials Engineering, NIT Rourkela: July 2020 – June 2023.
5. Professor in charge – Convocation, NIT Rourkela: July 2023 – June 2024.
6. Dean (Faculty Welfare) – NIT Rourkela: July 2024 - continue.

Fellow of:

The Institute of Engineers (F-124577-1)

Senior member of:

The Indian National Academy of Engineering

Life member of:

Indian Institute of Metals (LM 34341)
Material Research Society of India (LMB 1558)
The Indian Science Congress Association (L17458)
The Plasma Science Society of India (LM1200)

Chartered Engineer of India:

No: F-124577

Ph. D Supervision: Name of Scholar and Thesis title –

1. **Mohan. N,** Development of Nano-TiO_2/Y_2O_3 Dispersed Zirconium Alloys by Mechanical Alloying Followed by Conventional and Spark Plasma Sintering, 2016
2. **H. Moharana,** Surface Modification of Copper by Electro-codeposition, 2016
3. **D. Narsimhachary,** Laser weld-brazing of aluminum alloy (AA6082/AA5083) and galvanized interstitial free steel with an emphasis on fatigue and corrosion study, 2020.

4. **Jichil Majhi,** Microstructural correlation of creep, tensile and corrosion behaviour of AZ91 magnesium alloy with Bi, Ca and Sr additions, Co-Supervisor, 2022
5. **Pundrikaksha Upadhyay,** Zn based electrodeposition (thesis submitted), Co-Supervisor
6. **Adarsh Kushwaha,** Electrodeposition and ultrasonic shot peening based hybrid metallic coating (ongoing).
7. **Sivasubramanian J,** Ultrasonic shot peening-based surface engineering (ongoing)

M. Tech (Research) Supervision: Name of Scholar and Thesis title –

D. Narsimhachary, Effect of Laser welding parameters on 6061 Aluminium alloy

Research at the Doctoral Level:

Topic: Surface engineering of SAE 52100 steel

Abstract: SAE 52100 is a commonly used high carbon low alloy steel for various applications like bearing, forming rolls, spindles, tools, and precision instrument parts. Though this steel is mostly used in hardened and tempered conditions, alternate or supplementary strategies of surface hardening may be useful in applications where higher hardness and wear resistance are required. To understand the scope and extent of such modification, it is logical to carry out the surface engineering treatments in annealed rather than in hardened conditions. Thus, surface hardening of SAE 52100 steel in the present study has been carried out in annealed condition by several techniques to improve the surface mechanical properties like hardness and wear resistance.

In the study the techniques used for surface modification are (a) combination of conventional electrodeposition of chromium followed by gas nitriding to develop a hard chromium nitride layer for improving wear resistance; (b) plasma nitriding of SAE 52100 steel to form a dispersed nitrided layer on the surface; (c) development of a hard wear-resistant layer on the surface by laser surface coating of multi-component powder blend (with composition in the amorphous range).

In addition to the above, laser surface hardening was also carried out on SAE 52100 steel in austempered conditions to obtain a combination of a tough core and a hard surface for having a high load-bearing capacity and wear resistance. This was carried out in view of the recent preference of using austempered (bainitic) steel over hardened and tempered versions for bearing application.

The first three approaches are suitable for applications where surface hardness and corrosion are the main concerns irrespective of the mechanical properties of the substrate underneath. Surface hardening of austempered SAE 52100 steel is best suited for high hardness, wear-resistant and low friction applications where the core must also possess adequate load-bearing capacity (tough core). In all the cases, improvement in hardness and wear was significant, whereas corrosion resistance was enhanced only after plasma and gas nitriding (with pre-deposited Cr coating).

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(Updated on: 9th March 2025)