

Dr Nitin Pandurang Wasekar

Academic and Professional Information

PhD (Metallurgical and Materials Engineering), 2013, IIT Madras, Chennai
M. Engg. (Metallurgy), 2001-2003, Indian Institute of Science, Bangalore
B. Engg. (Metallurgy), 1997-2001, National Institute of Technology, Nagpur

Scientist, International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI) Hyderabad, 2003-present (**Scientist 'F'**)



Supervision of PhD, Masters/Bachelor thesis

No. of PhD guiding: 1
No. of JRF guided: 2
No. of M Tech thesis guided: 3
No. of B Tech thesis / trainees guided: 14

PhD Supervision (On-going)

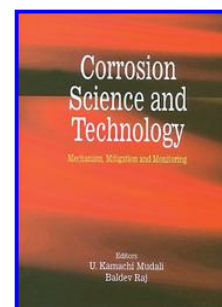
Development of wear resistant multilayer Ni-W alloy coatings using pulsed electrodeposition.

Knowledge Dissemination

Book Chapter in: Corrosion Science and Technology
Ed: U. Kamachi Mudali and Baldev Raj

- Pub. Date: July 2008
- Publisher: Taylor & Francis, Inc.
- ISBN-13: 9780849333743
- ISBN: 0849333741

Chapter Details: Coating for Corrosion Resistance. Page number: 243-283



Publications

(36 International + 2 National Journals) listed at the end

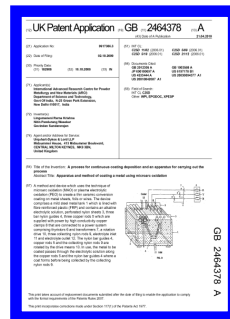
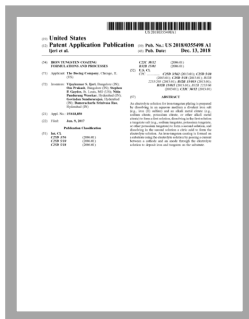
h-Index: 21 (Scopus), 22 (Google Scholar: May 2023)

i10-Index: 28

Google Scholar: [Nitin P. Wasekar - Google Scholar](#)

Patents

- (1) AN IMPROVED METHOD FOR PREPARING NICKEL ELECTRODEPOSITE HAVING PREDETERMINED HARDNESS GRADIENT
Indian Patent No: 285178 (Granted on 14/07/2017)
- (2) A PROCESS FOR CONTINUOUS COATING DEPOSITION AND AN APPARATUS FOR CARRYING OUT THE PROCESS,
US Patent No. 9365945 B2 (Granted on 14/06/2016)
- (3) A METHOD AND AN APPARATUS FOR PREPARING NICKEL TUNGSTEN BASED NANOCOMPOSITE COATING DEPOSITION
Indian Patent No: 337108 (Granted on 20/05/2020)
- (4) IRON TUNGSTEN COATING FORMULATIONS AND PROCESSES
US Patent No. 11208731 B2 (Granted on 28/12/2021)



Technology Development

Under **make in India initiative**, the Ni-W alloy coatings developed using novel pulsed electrodeposition technology developed by me resulted in substantial improvement in coating properties than conventional hard chrome coatings, which are subjected to ban due to environmental regulations across the world, and soon in India. This led to patent filing in India and U.S.A. to cater the export potential. Major achievements are highlighted below:

Pulsed Electrodeposition Technology Development

1.1 Engineering Research

1.2 Innovative Technology Development

1.3 Technology Demonstration

1.4 Design of Scaled-up Version

1.5 Technology Transfer

Upon successful demonstration, the technology transfer activity has been signed on 24th August 2017 with M/s Hyderabad Electroplating Works, Hyderabad India for know-how demonstration and subsequent transfer.

- ✓ Development of Micro Arc Oxidation continuous coating system for thin Al foil used in oil free transformers
- ✓ Fatigue behavior of alumina coatings deposited using micro arc oxidation.
- ✓ Pulsed electrodeposition of Ni-P, Ni-Mo, Ni-B, Ni-W/ZnO, Ni-B/SiC as an alternative to conventional electroless plating.
- ✓ Micro-Tensile testing of miniature samples deposited using various coating technologies to evaluate their mechanical properties.
- ✓ Corrosion and wear tests of various coatings developed at laboratory.

Coatings of Ni-P, Ni-W, Nano Ni deposition on various industrial components from automobile as well as aerospace applications.

Funding

Principal Investigator for following funded projects:

1. Development of Ni based (W, Mo) alloy coatings for hard chrome replacement– **SERB/DST: INR 43 lakhs.** (Aug-2013 to 2017)
2. Development of environment friendly Fe-W alloy coatings to replace hexavalent chrome plating funded by **Boeing, USA: INR 25 lakhs.** (Aug-2015 to 2016)
3. Development of Zn/Zn-Ni/Zn-Fe reinforced nanocomposite coatings using pulsed current deposition funded by **Tata Steel Ltd: INR 40 lakhs** (Completed)
4. Development of hard chrome replacement Ni based alloy coatings for gun barrel applications, funded by Ministry of Defense GOI, **ARMREB: INR 41 lakhs** (Ongoing)

Peer Recognition

- **2nd Prize for the “Best Oral Presentation”** ‘Compositional gradient nanocrystalline Ni-W coatings for superior wear resistance’ at the “76th Annual Technical Meeting of Indian Institute of Metals-2022” NMD ATM, Hyderabad
- **Best Poster Runner-up Award:** International Conference on Strength of Materials (ICSMA-2022) held at Metz, France
- **Best Reviewer of the Year 2020:** Transactions of Indian Institute of Metals, Springer Nature
- **Best Reviewer of the Year 2019:** Transactions of Indian Institute of Metals, Springer Nature
- **Indo-Australia Early and Mid-Career Research (EMCR) Fellowship** at Queensland University of Technology, Brisbane, Australia, Sept 2017 to May 2018.
- **Felicitation by Indian Institute of Metals (IIM) Hyderabad Chapter** for EMCR fellowship during Annual General Body Meeting 14 September 2017.
- **Best Paper of the Session Award for Poster Presentation** titled “Effect of Silicon Carbide on Microstructure and Mechanical Properties of Pulsed Electrodeposited Nickel Tungsten Composite Coating” at International Conference on Emerging Trends in Materials and Manufacturing Engineering (**IMME17**) 10-12 March 2017.
- **Outstanding Contribution in Reviewing-2018:** Surface and Coatings Technology.
- **All India Rank (AIR) 38:** Graduate Aptitude Test in Engineering (GATE) 2001: Metallurgical Engineering.
- **Fourth Rank (Nagpur University):** Metallurgical Engineering.
- **Cover image of Pulsed Electrodeposited Zinc coating on Surface Engineering Bulletin, Vol 3, Issue 2 (2010).**
- **Article ‘Influence of mode of electrodeposition, current density and saccharin on the microstructure and hardness of electrodeposited nanocrystalline nickel coatings’ featured in most cited ‘Surface and Coating Technology’ articles published since 2016.**



Contributions to the institute

Safety coordinator for center for engineered coatings at institute, Reviewer for PhD thesis, Mentor to various graduate trainees at center, Set up of fatigue testing, micro tensile testing, microscopy, hardness and microscopy facility at center, Set up of pulsed electrodeposition facility at center, In charge of physical verification of stock at technical information center at institute, Member search-cum-selection committee JRF, Scientist at Institute. External examiner for PhD thesis IIT Bombay, External examiner for BTech viva-voce.

Contributions outside the institute

- a. Reviewer of project proposals under International Cooperation (Bilateral) Programme or Scheme: India Ukraine Joint Call.
- b. Reviewer of project proposals under International Cooperation (Bilateral) Programme or Scheme: India Uzbekistan Joint Call.
- c. Reviewer of project proposal under the executive government agency of National Science Centre, Polish Academy of Sciences.

Reviewer: Progress in Materials Science, Corrosion Science, Surface and Coatings Technology, Electrochimica Acta, Journal of Materials Engineering and Performance, Journal of Alloys and Compounds, Materials and Design, Ceramic International, Applied Surface Science, Transactions of Indian Institute of Metals, Diamond and related Materials and many more SCI indexed journals

Membership of Professional Bodies

Indian Institute of Metals (IIM) (Life Member # **42677**),

Electrochemical Society of India (Life Member# **270**),

Materials Research Society of India (MRSI) (Life Member# **LMB2369**)

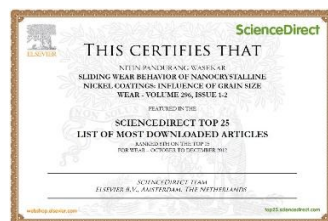
Publications

1. H. Seekala, L. Bathini, [N.P. Wasekar](#), H. Krishnaswamy, P Sudharshan Phani, A unified approach to quantify the material and geometrical effects in indentation size effect. *Journal of Materials Research* **38** (2023) 1740-1755.
2. SB Chandrasekhar, M Ramakrishna, [NP Wasekar](#), TN Rao, BP Kashyap, Grain boundary and grain interior strengthening in nano-micron grain sized Cu-1wt.%Al₂O₃ composite, *Materials Science and Technology*, (2023) 1-9.
3. L Bathini, M Prasad, [NP Wasekar](#), Compositionally modulated Ni-W multilayer coatings: A facile approach to enhance the tribological performance, *Tribology International* (179) (2023) 108145.
4. L Bathini, M Prasad, [NP Wasekar](#), Development of continuous compositional gradient Ni-W coatings utilizing electrodeposition for superior wear resistance under sliding contact, *Surface and Coatings Technology* 445, 128728
5. [Nitin P. Wasekar](#), Anthony P.O'Mullane, Md AbuSayed, G.Sundararajan, Influence of SiC reinforcement content and heat treatment on the corrosion behavior of pulsed electrodeposited Ni-W alloy metal matrix composite, *Materialia*, 22 (2022) 101390.
6. [Nitin P. Wasekar](#), The influence of grain size and triple junctions on corrosion behavior of nanocrystalline Ni and Ni-W alloy, *Scripta Materialia*, 213 (2022) 114604.
7. S Julie, [Nitin P. Wasekar](#), PK Parida, S Santra, C David, M Kamruddin, Effect of Grain Size on the Thermal Stability of Electrodeposited Nanocrystalline Nickel: X-Ray Diffraction studies, *Thin Solid Films* 745 (2022) 139114.
8. S Julie, MK Dash, [Nitin P. Wasekar](#), C David, M Kamruddin, Effect of annealing and irradiation on the evolution of texture and grain boundary interface in electrodeposited nanocrystalline nickel of varying grain sizes, *Surface and Coatings Technology* 426 (2021) 127770.
9. [Nitin P. Wasekar](#), Lavakumar Bathini, L. Ramakrishna, D. Srinivasa Rao and G. Padmanabham, Pulsed electrodeposition, mechanical properties and wear mechanism in Ni-W/SiC nanocomposite coatings used for automotive application, *Applied Surface Science* 527 (2020) 146896.
10. [Nitin P. Wasekar](#), N. Hebalkar, A. Jyothirmayi, B. Lava Kumar, M. Ramakrishna and G. Sundararajan, Influence of pulse parameters on the mechanical properties and electrochemical corrosion behavior of electrodeposited Ni-W alloy coatings with high tungsten content, *Corrosion Science* 165 (2020) 108409.
11. [Nitin P. Wasekar](#), L. Ramakrishna, D. S. Rao and G. Padmanabham, Novel nanostructured coatings by pulsed electrodeposition, *Indian Engineering Exports*, 12(7) (2019) 16-24.

12. Nitin P. Wasekar, S. Gowthami, A. Jyothirmayi, J. Joardar & G. Sundararajan, Corrosion behaviour of compositionally modulated nanocrystalline Ni–W coatings, *Surface Engineering*, 36:9 (2020) 952-959.
13. Nitin P. Wasekar, S. Verulkar, M.V.N. Vamsi, G. Sundararajan, Influence of molybdenum on the mechanical properties, electrochemical corrosion and wear behavior of electrodeposited Ni-Mo alloy, *Surface and Coatings Technology*, 370 (2019) pp. 298-310.
14. Nitin P. Wasekar, A. O'Mullane, G. Sundararajan, A new model for predicting the grain size of electrodeposited nanocrystalline nickel coatings containing sulphur, phosphorus or boron based on typical systems, *Journal of Electroanalytical Chemistry*, 833 (2019) pp. 198-204.
15. Nitin P. Wasekar, L. Bathini, G. Sundararajan, Tribological behavior of pulsed electrodeposited Ni-W/SiC nanocomposites, *Journal of Materials Engineering and Performance*, 27 (2018) pp 5236-5245.
16. MVN Vamsi, Nitin P. Wasekar, G. Sundararajan, sliding wear of as-deposited and heat-treated nanocrystalline nickel-tungsten alloy coatings, *Wear*, 412 (2018) pp. 136-143.
17. U S Wawre, AMS Homouda, Nitin P. Wasekar, Mechanical Properties, thermal stability and corrosion behavior of electrodeposited Ni-B/AlN nanocomposite coatings, *Surface and Coatings Technology*, 337 (2018) pp. 335-341.
18. Nitin P. Wasekar, Prathap Haridoss, G. Sundararajan, Solid Particle erosion of nanocrystalline nickel coatings: Influence of grain size and adiabatic shear bands, *Metallurgical and Materials Transactions A*, 49(2) (2018) pp. 476-489.
19. LR Krishna, Y. Madhavi, T. Sahithi, Nitin P. Wasekar, NM Chavan, D S Rao, Influence of prior shot peening variables on the fatigue life of micro arc oxidation coated 6061-T6 Al alloy, *International Journal of Fatigue*, 106 (2018) pp. 165-174.
20. M.V.M. Vamsi, Nitin P. Wasekar, G. Sundararajan, Influence of heat treatment on microstructure and mechanical properties of pulsed electrodeposited Ni-W alloy coatings, *Surface and Coatings Technology*, 319 (2017) pp. 403-414.
21. M. Sribalaji, O.S.A Asiq Rahman, P. Arun Kumar, K. Suresh Babu, Nitin P. Wasekar, G. Sundararajan, A. K. Keshri, Role of Silicon Carbide in Phase-Evolution and Oxidation Behaviors of Pulse Electrodeposited Nickel-Tungsten Coatings, *Metallurgical and Materials Transactions A*, 48(1) (2017) pp.501-512.
22. U. S. Waware, Nitin P. Wasekar, Manufacture and properties of Ni-B-Fe₂O₃ composite nano-coatings by electrodeposition, *Journal of Material Sciences & Engineering*, 6(6) 2017, pp. 1-7.
23. Nitin P. Wasekar, S. Madhavi Latha, M. Ramakrishna, D.S. Rao and G. Sundararajan, Pulsed Electrodeposition and Mechanical Properties of Ni-W/SiC nanocomposite coatings, *Materials and Design*, 112 (2016) pp. 140-150.
24. Kumar, S., Jyothirmayi, A., Nitin P. Wasekar, Joshi, S.V., Influence of annealing on mechanical and electrochemical properties of cold sprayed niobium coatings, *Surface and Coatings Technology*, 296 (2016) pp. 124-135.
25. Rahman, O.S.A., Nitin P. Wasekar, Sundararajan, G., Keshri, A.K., Experimental investigation of grain boundaries misorientations and nano twinning induced strengthening on addition of silicon carbide in pulse electrodeposited nickel tungsten composite coating, *Materials Characterization*, 116 (2016) pp. 1-7.
26. Nitin P. Wasekar, Haridoss, P., Seshadri, S.K., Sundararajan, G., Influence of mode of electrodeposition, current density and saccharin on the microstructure and hardness of electrodeposited nanocrystalline nickel coatings, *Surface and Coatings Technology*, 291 (2016) pp. 130-140.
27. S. B. Chandrasekhar, Nitin P. Wasekar, M. RamaKrishan, P. S. Babu, T. N. Rao, B. Kashyap, Evidence of dynamic strain ageing at room temperature in fine grained Cu-1wt%Al₂O₃ composite, *Journal of Alloys and Compounds*, 656 (2016) pp. 423-430.
28. Singh, S., Sribalaji, M., Nitin P. Wasekar, Joshi, S., Sundararajan, G., Singh, R. Keshri, A.K. Microstructural, phase evolution and corrosion properties of silicon carbide reinforced pulse electrodeposited nickel-tungsten composite coatings, *Applied Surface Science*, 364 (2016), pp. 264-272.
29. Nitin P. Wasekar, G. Sundararajan, Sliding wear behavior of electrodeposited Ni-W alloy and hard chrome coatings, *Wear* 342 (2015) pp. 340-348.
30. Nitin P. Wasekar, Jyothirmayi, A., Hebalkar, N., Sundararajan, G., Influence of pulsed current on the aqueous corrosion resistance of electrodeposited zinc, *Surface and Coatings Technology* 272 (2015) pp. 373-379.
31. Telasang, G., Dutta Majumdar, J., Nitin P. Wasekar, Padmanabham, G., Manna, I., Microstructure and Mechanical Properties of Laser Clad and Post-cladding Tempered AISI H13 Tool Steel, *Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science*, Vol 46 (5) (2015) pp. 2309-2321.

32. Nitin P. Wasekar, Haridoss, P., Seshadri, S.K., Sundararajan, G., Sliding wear behavior of nanocrystalline nickel coatings: Influence of grain size, *Wear*, Vol. 296 (2012), pp. 536-546.
33. Sanikommu, N., Nitin P. Wasekar, Joshi, A.S., Sundararajan, G., A virtual instrument for pulsed electrodeposition: A novel technique for obtaining graded coatings, *Journal of Scientific and Industrial Research*, Vol.70 (12) (2011), pp. 1026-1028.
34. Nitin P. Wasekar, Jyothirmayi, A., Sundararajan, G., Influence of prior corrosion on the high cycle fatigue behavior of microarc oxidation coated 6061-T6 Aluminum alloy, *International Journal of Fatigue*, Vol.33 (9) (2011) pp. 1268-1276.
35. Sundararajan, G., Nitin P. Wasekar, Ravi, N., The influence of the coating technique on the high cycle fatigue life of alumina coated Al 6061 alloy, *Transactions of the Indian Institute of Metals*, Vol.63 (2010) pp. 203-208.
36. Nitin P. Wasekar, Ravi, N., Suresh Babu, P., Rama Krishna, L., Sundararajan, G., High-cycle fatigue behavior of microarc oxidation coatings deposited on a 6061-T6 Al alloy, *Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science*, Vol.41 (1) (2010) pp. 255-265.
37. Nitin P. Wasekar, Jyothirmayi, A., Krishna, L.R., Sundararajan, G., Effect of micro arc oxidation coatings on corrosion resistance of 6061-Al alloy, *Journal of Materials Engineering and Performance*, Vol.17 (5) (2008) pp. 708-713.
38. Krishna, L.R., Sudhapurnima, A., Nitin P. Wasekar, Sundararajan, G., Kinetics and properties of micro arc oxidation coatings deposited on commercial Al alloys, *Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science*, Vol. 38(2) (2007) pp. 370-378.

- o Research paper entitled "Sliding wear behavior of electrodeposited Ni-W alloy and hard chrome coatings" ranked **1st** amongst ScienceDirect top 25 most downloaded articles for *Wear* journal from October-December 2015.
- o Research paper entitled "Sliding wear behavior of nanocrystalline Ni coatings: Influence of grain size" ranked at **8th** amongst ScienceDirect top 25 most downloaded articles for *Wear* journal from October-December 2012.



Conference Presentations

1. Invited talk 'The influence of grain size on corrosion resistance of metals', International Conference and Exhibition on Emerging Materials and Technologies along with the Heat Treat Show (MET + HTS) during November 02-04, 2022 at Bombay Exhibition Centre, Goregoan East, Mumbai.
2. Invited lecture 'Pulsed electrodeposition of nanostructured coatings: from synthesis to applications in automotive industry' in AICTE-QIP STC on Materials Engineering from synthesis to applications hosted by IIT Indore from 21-26 Feb 2022.
3. Invited talk 'Electroplating for defense application', Brain Storming Sessions on "Coatings for Armament Applications" 30 Jan 2020, Armament Research and Development Establishment, Ministry of Defense, Pune.
4. Invited talk and Panel discussion, 'Mechanism of Metal Matrix Composite Electrodeposition', Electrodeposition of composite coatings Workshop, 16-17 Dec 2019, Tata Steel Jamshedpur.
5. Invited talk on 'Pulsed Electrodeposition of Coatings' at All India Seminar on Advances in Metallurgy and Manufacturing Process, 13-14 July 2018 at Telangana State Centre organized by The Institute of Engineers (India).

6. *Invited talk on 'Corrosion behavior of Pulsed Electrodeposited Ni-W/SiC nanocomposite coatings' at National Conference on Industrial Coatings, 24-25 January 2019 organized by CSIR-Institute of Minerals & Materials Technology Bhubaneswar in association with Electrochemical Society of India, IISc Bangalore.*
7. *G. Sundararajan, MVN Vamsi, Nitin P. Wasekar, Influence of tungsten content on mechanical properties, wear and corrosion behavior of pulsed electrodeposited Ni-W alloy coatings, MS&T 2017, Oct 8-12, Pittsburgh, Pennsylvania, USA.*
8. *G. Sundararajan, Nitin P. Wasekar, Tribological behavior of pulsed electrodeposited Ni-W/SiC nanocomposites, 28th Advanced Aerospace Materials and Processess (AEROMAT 2017) Conference and Exposition, April 10-12, Charleston, South Carolina, USA.*
9. *O.S. Asiq Rahman, Nitin P. Wasekar, A.K. Keshri, Effect of SiC on microstructure and mechanical properties of pulse electrodeposited Ni-W composite coatings, IMMEE17, March 10-12, NIT Tiruchirapalli, India.*
10. *Nitin P. Wasekar, D. S. Rao, G. Sundararajan, Dry sliding wear behavior of pulse electrodeposited Ni-W-SiC nanocomposite coatings as an alternative for hard chrome replacement, Euromat 2015, Sept 20-24, Warsaw, Poland.*
11. *G. Sundararajan, Nitin P. Wasekar, Solid particle erosion behavior of electrodeposited nanocrystalline nickel coatings. MS&T 2015, Oct 4-8, Columbus, Ohio, USA.*
12. *S. K. Gautham, C. David, M.S. Karthiselva, B.K. Panigrahi, Nitin P. Wasekar, B. Srinivasa Rao. The effect of nanocrystalline grain size on mechanical property variation during irradiation of electrodeposited nickel coatings. TMS-2014, Feb 16-20, San Diego, CA, USA.*
13. *G. Sundararajan and Nitin P. Wasekar. Influence of tungsten additions on mechanical and tribological behavior of pulsed electrodeposited nanocrystalline nickel coatings. International Conference on Processing and Manufacturing of Advanced Materials, THERMEC-2013, Dec 2-6 2013, Las Vegas, USA.*
14. *G. Sundararajan and Nitin P. Wasekar. Solid particle erosion behavior of nanocrystalline nickel coatings: Influence of grain size and adiabatic shear bands. MS&T-2013, Montreal, Quebec, Oct 27-31, Canada.*
15. *Nitin P. Wasekar, G. Sundararajan, Prathap Haridoss and S K Seshadri. Mechanical Properties of Nanocrystalline graded and layered Ni coatings, International Symposium for Research Scholars on Metallurgy, ISRS-2010, 20-22 Dec, IITM Chennai India.*
16. *G. Sundararajan, Nitin P. Wasekar. Nanostructured and Layered Nickel coatings: Mechanical and Tribological Behavior, TMS-2010, 139th Annual Meeting and Exhibition, Feb 14-18, Seattle, Washington, USA.*
17. *Nitin P Wasekar, G. Sundararajan, L. RamaKrishna, N. Ravi. High Cycle Fatigue Performance of Micro Arc Oxidation Coatings deposited on 6061 Al alloy at 32nd International Conference & Exposition on Advanced Ceramics and Composites (ICACC-2008) Jan 27-Feb1, Daytona Beach, Florida, USA.*
18. *G. Sundararajan, P. S. Phani, Nitin P. Wasekar. Indentation Behavior of Porous Copper, 3rd International Indentation Workshop, 15-21st July 2007, Cambridge, United Kingdom.*
19. *Nitin P. Wasekar, A. Jyothirmayi, G. Sundararajan. Corrosion Behavior of Micro Arc Oxidation coatings at National Symposium on Electrochemical Science and Technology, Indian Institute of Science Bangalore, 22-23 July 2005, conducted by The Electrochemical Society of India, Bangalore.*