

**Researchgate Webpage:** [https://www.researchgate.net/profile/Anshuman\\_Patra](https://www.researchgate.net/profile/Anshuman_Patra)

**Name :** Prof. Anshuman Patra

**Designation :** Assistant Professor-Grade I

**Address:**

**a) Present :** Department of Metallurgical and Materials Engineering National Institute of Technology Rourkela, Rourkela- 769008, Odisha, India

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### ACADEMIC QUALIFICATION

Degree	Institute/ Board	Period	Branch	Specialization	CGPA/ %Marks
Ph. D	NIT Rourkela	2014-2017	Metallurgical and Materials Engineering	Oxide dispersion strengthened W alloys	9.54/10
M. Tech	IIT Kharagpur	2007- 2009	Metallurgical and Materials Engineering	Oxidation resistant W alloys	9.48/10
B. E	Bengal Engineering and Science University Shibpur	2002-2006	Metallurgical and Materials Engineering	Al <sub>2</sub> O <sub>3</sub> reinforced Cu alloys	81.45%

### PROFESSIONAL EXPERIENCE

Employer	Position	Period	Nature of Work
National Institute of Technology, Rourkela	Assistant Professor	28.05.2014 to till date	Teaching & Research work
Hindalco Industries Limited	Assistant Manager	25.07.2011 to 24.05.2014	Quality control & development of rolled products
Electrosteel Castings Limited	Assistant Manager	01.07.2009 to 18.07.2011	Production & Quality Control of centrifugally casted Ductile Iron pipes
Cognizant Technology Solutions	Programmer Analyst	21.08.2006 to 13.07.2007	Production support and abend control.

## RESEARCH AREAS

- Nanostructured Materials : Synthesis and Characterization
- Nonconventional consolidation and sintering.
- High Temperature Materials.
- Oxide dispersed strengthened alloys.
- High entropy alloys

## COURSES TAUGHT

- Iron Making (UG, PG )
- Steel Making (UG, PG)
- Secondary Steel Making (UG)
- Principle and Practice of Heat Treatments (UG, Int. M. Sc)
- Casting and solidification (UG)
- Manufacturing Process (UG)
- Value Education and Ethics (UG)

## LABORATORY COURSES TAUGHT

- Thermodynamics and Kinetics Laboratory (PG).
- Product Development Laboratory (UG).
- Thermodynamic Modeling of Metallic Materials Laboratory (UG)
- Computational Metallurgy Laboratory (UG)
- Mineral Dressing Laboratory (UG)

## THESIS SUPERVISION

### Ph. D

Sl. No.	Name	Current Status
1	Sambit Swain	Ongoing
2	Atiqur Rahman Khan	Ongoing

### M. Tech

Sl. No.	Name	Year
1	Akash Adinath Borate	2022-23
2	Akhil M	2021-22

3	Ahmed Faraaz Manzoor Ahmed Siddiqui	2020-21
4	Bappa Das	2019-20
5	Gotivada Maheswara Rao	2018-19
6	Vikram Rambhau Talekar	2017-18
7	Rasmiranjan Sahoo	2016-17
8	Rishabh Saxena	2015-16

### B. Tech, B. Tech and M. Tech Dual Degree

Program	Completed	Ongoing
B.Tech	13	1
B. Tech and M. Tech Dual Degree	2	1

### AWARDS & ACHIEVEMENTS

- University Medal for **1<sup>st</sup> Rank** in Metallurgical and Materials Engineering (B.E) (2007).
- State Scholarship in High Secondary.
- Qualified State Level Eligibility Test (WBJEE 2002).
- Merit Scholarship in B.E.
- Qualified National Level Test (GATE) in 2006.
- Indranil Award From Mineral Geological & Metallurgical Institute of India (MGMI)
- M.H.R.D scholarship in Master of Technology (M. Tech).
- Gold Certification from Aditya Birla Gyanodaya.
- Zero Abnormality Monitoring (ZAM) and Kaizen Award from Hindalco Industries Ltd.
- Research Grant from TEQIP, NIT Rourkela.
- Biographical note listed in Asia Pacific who's who.
- Associate Editor (Guest) : Journal of Materials Engineering and Performance (Springer) (2022-23).
- Section Editor : Materials Chemistry (Scientific Reports: Nature)
- Faculty Advisor Appreciation Award from NIT Rourkela (2022).

### PROFESSIONAL AFFILIATIONS

- Life Member of Indian Institute of Metals (IIM)
- Life Member of Powder Metallurgical Association of India (PMAI).
- Life Member of Indian Science Congress (ISCA).
- Member of the Institution of Engineers (IEI).

## **JOURNAL REVIEWER**

Acta Materialia || Scientific Reports (Nature) || Materials and Design || Journal of Alloys and Compounds || Applied Surface Science || Materials Chemistry and Physics || Ceramic International || Advanced Engineering Materials || Journal of Materials Engineering and Performance || JOM || International Journal of Refractory Metals and Hard Materials || Materials Today Communications || Transactions of Indian Institute of Metals.

## **ACADEMIC AND ADMINISTRATIVE RESPONSIBILITY**

- Core Committee Member of Accreditation and Ranking, NIT Rourkela.
- Member of Centre for Intellectual Property Rights (CIPR)
- Member of Institute Write up committee.
- Co-PIC: Physical Education.
- Faculty advisor of B. Tech and B. Tech+ M. Tech Dual degree [(2018-2022(23)), [2025-2029(30)].
- PIC- Accreditation (UG) (Metallurgical and Materials Engineering).
- PIC-Dual degree research project.
- Member of department purchase committee.

## **LABORATORY DEVELOPMENT**

Developed a nanomaterials research laboratory for synthesis of commercial powders and consolidation by powder metallurgy route funded by ARMREB (DRDO).

## **OTHER ASSIGNMENTS AND ACADEMIC OUTREACH**

1. Coordinator of workshop on “From Idea to Asset: Understanding the IP life cycle”, organized by Intellectual Property Innovation Center (IPIC), NIT Rourkela from 3<sup>rd</sup>-4<sup>th</sup> September, 2025.
2. Coordinator of 38<sup>th</sup> National Convention of Metallurgical and Materials Engineering and National Conference on Capacity Building in Process Metallurgy, (CBPM-2025) organized by The Institution of Engineers (India) in association with National Institute of Technology Rourkela from July 26-27, 2025.
3. Co-ordinator of 5 days online workshop on “Metal Additive Manufacturing: Recent Progress and Future Opportunities” organized by Department of Mechanical Engineering, NIT Rourkela, from 7<sup>th</sup> - 11<sup>th</sup> July, 2025.
4. Chairperson of 6<sup>th</sup> International Conference on Processing and Characterization of Materials (ICPCM2024) organized by Department of Metallurgical and Materials Engineering, NIT Rourkela from 5<sup>th</sup>-7<sup>th</sup> December 2024.
5. Co-ordinator of 5 days short term course (online) on “Roadmap for Green Steel Production : Industry 4.0”, organized by Department of Metallurgical and Materials Engineering from 1-5<sup>th</sup> July 2024.

6. Secretary of 5<sup>th</sup> International Conference on Processing and Characterization of Materials (ICPCM2023) organized by Department of Metallurgical and Materials Engineering, NIT Rourkela from 8-10<sup>th</sup> December 2023.
7. Coordinator of Vedanta Aluminium and NIT, Rourkela Campus Connect event, (2021).
8. Coordinator of online Diamond Jubilee event (18-19<sup>th</sup> September, 2021) organized by Metallurgical and Materials Engineering, NIT Rourkela.
9. Co-Convener of Conference on Processing and Characterization of Materials (CPCM 2020) organized by Department of Metallurgical and Materials Engineering from 18th - 20<sup>th</sup> December 2020.
10. One of the top ranking reviewers Certified by Transactions of Indian Institute of Metals, Springer.
11. Co-Convener of 2<sup>nd</sup> International Conference on Processing and Characterization of Materials organized by Department of Metallurgical and Materials Engineering, NIT Rourkela (ICPCM 2019).
12. Co-Coordinator of 5 days short term course on “Short Term Course on Powder Metallurgy: Fundamentals, Applications and Advancement” organized by Department of Metallurgical and Materials Engineering, NIT Rourkela from 1st- 5th July 2019.
13. Outstanding Reviewer for Ceramic International and Journal of alloys and Compounds, Certified by Elsevier.

#### **INVITED TALKS**

1. **Keynote talk** on “Perspective of challenges and future prospects in the Ferrous Metallurgy sector” at 38<sup>th</sup> National Convention of Metallurgical and Materials Engineering and National Conference on Capacity Building in Process Metallurgy, (CBPM-2025) organized by The Institution of Engineers (India) in association with National Institute of Technology Rourkela from July 26-27, 2025.
2. **Invited Speaker** at 4<sup>th</sup> Global Ceramic Leadership Roundtable Ceramics for Frontier Sectors: Emerging Advances and Prospects (CerAP2024), during 11-12<sup>th</sup> March 2024, organized by Centre for Space Science and Technology, IIT Roorkee, in association with iHUB DivyaSampark IIT Roorkee and Northeast India Chapter of the American Ceramic Society (ACerS).
3. **Invited Speaker** at International Conference on “Reducing Carbon Footprint in Metal Industries”, during 3-4<sup>th</sup> February 2023, organized by IIM Rourkela Chapter in association with SAIL-RSP and NIT Rourkela.
4. **Invited Speaker** at Short-Term Course on “Fundamentals and Advances in Powder Metallurgy (15th-20th March, 2021) organized by Metallurgy Engineering and Materials Science, IIT Indore.
5. **Invited Speaker** at Short-Term Course on “Fundamentals and Advances in Powder Metallurgy (8th-10th December, 2020) organized by Metallurgy Engineering and Materials Science, IIT Indore.
6. **Invited speaker** at ICN:3I-2017 at IIT Roorkee and Session Chairperson for Synthesis and Characterization.

## RESEARCH PUBLICATIONS

1. M. Akhil, **A. Patra**, Development of Mechanically Alloyed and Conventionally Sintered Porous Ni-Cr-Fe Alloys, *Journal of Materials Engineering and Performance*, 2025, doi : 10.1007/s11665-025-12104-6.
2. Bappa Das, Sumit Kumar Sinha, **Anshuman Patra**, Arka Ghosh, Shakti Kumar, Bishub Choudhury, Naveen Kumar Mindi, Microstructural and mechanical property enhancement of W–Zr alloys by nano- $\text{Al}_2\text{O}_3$ ,  $\text{Y}_2\text{O}_3$ , and  $\text{La}_2\text{O}_3$  dispersions: A combined MD simulation and experimental approach, *Journal of Alloys and Compounds*, 1040 (2025) 183502. Doi : 10.1016/j.jallcom.2025.183502.
3. S. Swain, **A. Patra**, Synthesis of oxide dispersion strengthened Mo-Ni-Si-Co alloys by mechanical alloying, *International Journal of Refractory Metals and Hard Materials*, 132 (2025) 107267, DOI : 10.1016/j.ijrmhm.2025.107267.
4. S. Swain, B. Agrawal, **A. Patra**, M. Debata, Fabrication of Nanostructured  $\text{Y}_2\text{O}_3$ ,  $\text{Y}_2\text{O}_3\text{-Al}_2\text{O}_3$ ,  $\text{Y}_2\text{O}_3\text{-TiO}_2$ ,  $\text{Y}_2\text{O}_3\text{-Cr}_2\text{O}_3$  Ceramic Oxides for Structural Applications. *Journal of Materials Engineering and Performance*, (2025), DOI : 10.1007/s11665-025-11291-6.
5. Atiqur Rahman Khan, Sambit Swain, **Anshuman Patra**, D. Arvindha Babu, Bhaskar Majumdar,. Effect of  $\text{Y}_2\text{O}_3$ ,  $\text{TiO}_2$ ,  $\text{ZrO}_2$  dispersion on oxidation resistance of W–Ni–Nb–Mo alloys, *International Journal of Materials Research*, 115(11-12) (2024) 960-969, DOI : 10.1515/ijmr-2024-0064.
6. Malaya Kumar Debta, **Anshuman Patra**, Santosh Kumar Sahoo, Manoj Masanta, TiC–NiCoCrFeTi high entropy alloy (HEA) composite coating fabricated by TIG arc scanning for improved tribological performance, *Surface and Coatings Technology*, 496 (2025) 131699. DOI : 10.1016/j.surfcoat.2024.131699.
7. Atiqur Rahman Khan, **Anshuman Patra**, Debasis Chaira, Santosh Kumar Sahoo, Diraviam Arvindha Babu, Investigation of Microstructure, Mechanical, and Tribological Behavior of Nano- $\text{Y}_2\text{O}_3$ ,  $\text{TiO}_2$ ,  $\text{ZrO}_2$ -Dispersed W–Ni–Nb–Mo–Zr Alloys Fabricated by Spark Plasma Sintering, *Advanced Engineering Materials*, 27(6) (2025) 2400819. DOI: 10.1002/adem.202400819.
8. B. Das, V. Suman, **A. Patra**, Comparative Study of Oxidation Behavior of  $\text{Cr}_2\text{O}_3$  Dispersed W-Zr Alloys at 800°C, 1000°C and 1200°C Fabricated Using Powder Metallurgy, *JOM*, 76 (2024) 3111–3127. DOI : 10.1007/s11837-024-06515-4.
9. A.R. Khan, **A. Patra**, D. Chaira, D. Arvindha Babu, Bhaskar Majumdar, Study of microstructure, thermodynamic and powder properties of nano  $\text{Y}_2\text{O}_3$ ,  $\text{TiO}_2$ ,  $\text{ZrO}_2$  dispersed W–Ni–Nb–Mo–Zr alloys, *Materials Chemistry and Physics*, 311 (2024) 128567. DOI : 10.1016/j.matchemphys.2023.128567.
10. A. R. Khan, **A. Patra**, D. Chaira, D. Arvindha Babu, V. Srinivas, Nano-indentation, Residual Stress, and Oxidation Study of Spark Plasma-Sintered Tungsten Alloys. *Journal of Materials Engineering and Performance*, 33 (2024) 5223–5235, DOI : 10.1007/s11665-023-08358-7.
11. Bappa Das, Atiqur Rahman Khan, **Anshuman Patra**, Effect of Nano- $\text{Cr}_2\text{O}_3$  Dispersed W-Zr Alloys by Mechanical Alloying and Pressureless Conventional Sintering, *Journal of Materials Engineering and Performance*, 33 (2024) 5236–5256, DOI : 10.1007/s11665-023-08357-8.
12. G. M. Rao, M. Akhil, B. Das, A.R. Khan, **A. Patra**, D. Chaira, Development and Characterization of Nano- $\text{Al}_2\text{O}_3$ ,  $\text{Cr}_2\text{O}_3$ , and  $\text{TiO}_2$  Dispersed Mo Alloys Fabricated by Powder Metallurgy, *Journal of Materials Engineering and Performance*, 32 (2023) 1683–1706. DOI : 10.1007/s11665-022-07215-3.
13. A. R. Khan, **A. Patra**, B. Majumdar, Synthesis of nano  $\text{Y}_2\text{O}_3$ ,  $\text{TiO}_2$ ,  $\text{ZrO}_2$  dispersed W-Ni- Nb-Mo alloys by mechanical alloying, *International Journal of Refractory Metals and Hard*

- Materials*, 103 (2022) 105753. DOI : 10.1016/j.ijrmhm.2021.105753.
14. G. K. Behera, **A. Patra**, Stepwise Microstructure Development and Investigation of Mechanical Behavior of Pure Mo, Mo-Ni, and Nano-Y<sub>2</sub>O<sub>3</sub>-Dispersed Mo-Ni Alloys Fabricated by Mechanical Alloying and Pressureless Sintering, *Journal of Materials Engineering and Performance*, 30 (2021) 6039–6048. DOI : 10.1007/s11665-021-05808-y.
  15. V. R. Talekar, **A. Patra**, S.K. Sahoo, Oxidation Behavior of Oxide Dispersion-Strengthened W-Ni Alloys, *Oxidation of Metals*, 93 (2020) 17-28. DOI : 10.1007/s11085-019-09942-w.
  16. V. R. Talekar, **A. Patra**, S. K. Sahoo, S. K. Karak, B. Mishra, Fabrication and characterization of nano-Y<sub>2</sub>O<sub>3</sub>, Al<sub>2</sub>O<sub>3</sub>, La<sub>2</sub>O<sub>3</sub> dispersed mechanically alloyed and liquid phase sintered W-Ni for structural application, *International Journal of Refractory Metals and Hard Materials*, 82 (2019) 183-198. DOI : 10.1016/j.ijrmhm.2019.03.027.
  17. Anand Babu Kotta, **Anshuman Patra**, Mithilesh Kumar, Swapan Kumar Karak, Effect of molasses binder on the physical and mechanical properties of iron ore pellets, *International Journal of Minerals, Metallurgy, and Materials*, 26 (1) (2019) 41-51. DOI : 10.1007/s12613-019-1708-x.
  18. R. Saxena, **A. Patra**, S.K. Karak, L. Ciupinski, Fabrication and characterization of nano- Y<sub>2</sub>O<sub>3</sub> dispersed W-Ni-Nb alloys, *International Journal of Refractory Metals and Hard Materials*, 71 (2018) 70-81. DOI : 10.1016/j.ijrmhm.2017.11.004.
  19. **A. Patra**, R. Saxena, R. R. Sahoo, S. K. Karak, T. Laha, Evaluation of Thermal, Fracture, and High Temperature Behavior of Mechanically Alloyed and Spark Plasma Sintered Nano- Y<sub>2</sub>O<sub>3</sub> Dispersed W-Ni-Mo and W-Ni-Ti-Nb Alloys, *Materials Performance and Characterization*, 7(1) (2018) 515-531. DOI: 10.1520/MPC20170077.
  20. S. K. Karak, **A. Patra**, F. Dąbrowski, L. Ciupinski, S. Sarkar, Development of nano-Y<sub>2</sub>O<sub>3</sub> dispersed Zr alloys synthesized by mechanical alloying and consolidated by pulse plasma sintering, *Materials Characterization*, 136 (2018) 337-345. DOI : 10.1016/j.matchar.2017.12.038
  21. **A. Patra**, R.R. Sahoo, S. K. Karak, S. K. Sahoo, Effect of nano Y<sub>2</sub>O<sub>3</sub> dispersion on thermal, microstructure, mechanical and high temperature oxidation behavior of mechanically alloyed W-Ni-Mo-Ti, *International Journal of Refractory Metals and Hard Materials*, 70 (2018) 134-154. DOI : 10.1016/j.ijrmhm.2017.09.015.
  22. **A. Patra**, R. Saxena, S.K. Karak, T. Laha, S.K. Sahoo, Fabrication and characterization of nano-Y<sub>2</sub>O<sub>3</sub> dispersed W-Ni-Mo and W-Ni-Ti-Nb alloys by mechanical alloying and spark plasma sintering, *Journal of Alloys and Compounds*, 707 (2017) 245-250. DOI : 10.1016/j.jallcom.2016.11.424.
  23. **A. Patra**, R. Saxena, S. K. Karak, Combined effect of Ni and nano- Y<sub>2</sub>O<sub>3</sub> addition on microstructure, mechanical and high temperature behavior of mechanically alloyed W- Mo, *International Journal of Refractory Metals and Hard Materials*, 60 (2016) 131-146. DOI : doi.org/10.1016/j.ijrmhm.2016.07.017.
  24. **A. Patra**, Md. Meraj, S. Pal, N. Yedla and S. K. Karak, Experimental and atomistic simulation based study of W based alloys synthesized by mechanical alloying, *International Journal of Refractory Metals and Hard Materials*, 58 (2016) 57–67. DOI : 10.1016/j.ijrmhm.2016.04.002.
  25. **A. Patra**, S. K. Karak, S.Pal, Effects of mechanical alloying on solid solubility, *Advanced Engineering Forum*, 15 (2016) 17-24. DOI: www.scientific.net/AEF.15.17.
  26. Suresh Telu, **A. Patra**, M. Sankaranarayana, R. Mitra and S. K. Pabi, Microstructure and Cyclic Oxidation Behavior of W-Cr Alloys Prepared by Sintering of Mechanically Alloyed Nanocrystalline Powders, *International Journal of Refractory Metals and Hard Materials*, 36 (2013) 191-203. DOI : 10.1016/j.ijrmhm.2012.08.015.

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**SELECTED CONFERENCE PROCEEDINGS**

1. Bappa Das, **Anshuman Patra**, Fabrication of nano-La<sub>2</sub>O<sub>3</sub> dispersed W-Zr alloy by mechanical alloying and conventional sintering, *Materials Today: Proceedings*, 62 (Part 10) (2022) 6055-6060.
2. D. K. Gardia, A. R. Khan, **A. Patra**, Microstructure, mechanical and wear properties of mechanically alloyed and conventionally sintered Nb-W and Nb-Mo alloys, *Materials Today: Proceedings*, 62 (10) (2022) 6204-6209.
3. Bappa Das, **A. Patra**, Fabrication of W-Ti-Mo alloys and its microstructure, mechanical properties prepared by mechanical alloying, *Materials Today: Proceedings*, 26 (Part 2) (2020) 2845-2852.
4. Bappa Das, **A. Patra**, Fabrication and characterization of nano-Cr<sub>2</sub>O<sub>3</sub> dispersed mechanically alloyed and conventional sintered W-Zr alloys, *Materials Today: Proceedings*, 33 (Part 8) (2020) 5109-5115.
5. P. Meher, C. Kiran, **A. Patra**, R. Saxena, S. K. Karak, Effect of Ni on microstructure, mechanical property of mechanically alloyed W-Ni-Nb, *Materials Today: Proceedings*, 18 (Part 3) (2019) 765-773.
6. V. R. Talekar, **A. Patra**, S. K. Karak, Fabrication and characterization of nano Y<sub>2</sub>O<sub>3</sub> and Al<sub>2</sub>O<sub>3</sub> dispersed W-Ni alloys by mechanical alloying and pressureless conventional sintering, *IOP Conf. Series: Materials Science and Engineering*, 338 (2018) 012037, DOI: 10.1088/1757-899X/338/1/012037.
7. **A. Patra**, S. K. Karak, R. Saxena, Fabrication and characterization of nano-ZrO<sub>2</sub> dispersed W-based alloy by mechanical alloying and conventional sintering, *Materials Today: Proceedings*, 4(2A) (2017) 3891-3902.
8. R. R. Sahoo, **A. Patra**, S. K. Karak, Fabrication of nano ZrO<sub>2</sub> dispersed novel W<sub>79</sub>Ni<sub>10</sub>Ti<sub>5</sub>Nb<sub>5</sub> alloy by mechanical alloying and pressureless sintering, *IOP Conf. Series: Materials Science and Engineering*, 178 (2017) 012015, DOI:10.1088/1757-899X/178/1/012015.
9. R. Saxena, A. Patra, S. K. Karak, A. Pattanaik, S. C. Mishra, Fabrication and Characterization of novel W<sub>80</sub>Ni<sub>10</sub>Nb<sub>10</sub> alloy produced by mechanical alloying, *IOP Conf. Series: Materials Science and Engineering*, 115 (2016) 012026, DOI:10.1088/1757-899X/115/1/012026.
10. **Anshuman Patra**, Swapan Kumar Karak and Shyamal Kumar Pabi, "Synthesis and Characterization of Nanostructured Tungsten-30 atomic % Chromium produced by Mechanical attrition and Hydrogen sintering", *Materials Science Forum*, 830-831 (2015) 59-62.
11. **A. Patra**, S. K. Karak, S. Pal, "Synthesis and Characterization of W<sub>80</sub>Ni<sub>10</sub>Mo<sub>10</sub> alloy produced by mechanical alloying", *IOP Conf. Series: Materials Science and Engineering*, 75 (2015) 012032, DOI:10.1088/1757-899X/75/1/012032.

**TECHNICAL REPORTS**

1. Atul Anand, **Anshuman Patra**, Swapan Kumar Karak, Characterization of novel W-Ni-Ti ternary alloys by XRD and SEM, Microscopy and analysis, John Wiley & Sons Ltd., 31 (6) (2017) 22-27.
2. **Anshuman Patra**, Swapan Kumar Karak, Snehanshu Pal, "Evolution of phase and mechanical, high temperature properties of nano tungsten-5 wt. % molybdenum alloy by mechanical alloying and argon purged Sintering", Microscopy and analysis, John Wiley & Sons Ltd, 29 (4), (2015) 18-22 (EU).

3. **Anshuman Patra**, Prospect of Unleashing Value Engineering for Industrial Growth, *International Journal of Advanced Research*, 2(11), (2014) 80-90.
4. **Anshuman Patra**, Sandipan Chatterjee, Indranil Ganguly, “Unleashing Innovation across the value chain-A motto for Growth”, *Journal of Innovation and Sustainability*, 4 (2) (2013) 47-59.
5. **Anshuman Patra**, “Improvement of Oxidation Resistance of Nanostructured Tungsten by Alloying: Analysis by SEM, TEM and XRD”, *Microscopy and Analysis*, John Wiley & Sons Ltd, 26(5) (2012) 14-19.

#### **BOOK PUBLISHED**

1. **Anshuman Patra**, *Oxide Dispersion Strengthened Refractory Alloys*, CRC Press, (2022), ISBN : 9781003201007.
2. S. Pal, **A. Patra**, P. R. Padhee, *Process Modeling for Steel Industry*, IK International Publishing, (2018), ISBN : 9789385909399.
3. **Anshuman Patra**, *Aluminium Alloys: From Casting to Customer*, Studium Press (2017), ISBN: 978-93-85046-00-1.
4. *Proceedings of the 6th International Conference on Processing and Characterization of Materials*, **Anshuman Patra**, Shashanka Rajendrachari (eds.), Springer: Singapore, 2025. 978-981-96-7339-1 (hardcover, ISBN) (edited).

#### **BOOK CHAPTER PUBLISHED**

1. **Anshuman Patra**, An Introduction to High Entropy Alloys, In: *Handbook of High Entropy Alloys*, Shashanka Rajendrachari (editor), 2025. pp. 22-38, CRC Press, Doi: [doi.org/10.1201/9781003664093](https://doi.org/10.1201/9781003664093).
2. **Anshuman Patra**, Powder Characterization Methods, In *Powder Metallurgy and Additive Manufacturing: Fundamentals and Advancements*, Shashanka Rajendrachari; Debasis Chaira (eds.), 2024, pp. 27-49, ASM International, Doi : [doi.org/10.31399/asm.tb.pmamfa.t59400027](https://doi.org/10.31399/asm.tb.pmamfa.t59400027).
3. **A. Patra**, Nano-structured Materials in Additive Manufacturing: Synthesis, Properties, and Applications. In: Rajendrachari, S. (eds), *Practical Implementations of Additive Manufacturing Technologies. Materials Horizons: From Nature to Nanomaterials*, (2024) Springer, Singapore. [https://doi.org/10.1007/978-981-99-5949-5\\_3](https://doi.org/10.1007/978-981-99-5949-5_3).
4. **A. Patra**, S. K. Karak, T. Laha, Synthesis and Characterization of Oxide Dispersion Strengthened W-based Nanocomposite, In: S. Sidhu, P. Bains, R. Zitoune, M. Yazdani, (eds) *Futuristic Composites. Materials Horizons: From Nature to Nanomaterials*, (2018), Springer, Singapore. [https://doi.org/10.1007/978-981-13-2417-8\\_13](https://doi.org/10.1007/978-981-13-2417-8_13).

**SPONSORED PROJECTS**

<b>Title</b>	<b>Sponsoring Agency</b>	<b>PI/Co-PI</b>	<b>Sanction Amount (Lakhs)</b>	<b>Duration (in months)</b>	<b>Status</b>
Fabrication of Nano-Oxide Dispersed Tungsten Alloys by Mechanical Alloying for Armaments Application	ARMREB (DRDO)	Principal Investigator (P.I)	42.76254	48	Completed

**CONSULTANCY PROJECTS**

<b>Title</b>	<b>Sponsoring Agency</b>	<b>Consultant /Co-Consultant</b>	<b>Duration (in months)</b>	<b>Status</b>
Feasibility to use Indigenous Coke for manufacturing Ferrochrome with low-phosphorous	Indian Metals and Ferroalloys	Co-Consultant	1	Completed