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Present Status

Assistant Professor in the Materials Science Center at Indian Institute of Technology, IIT-Kharagpur, India since November 2015.

Associated faculty in School of Nanoscience and Technology and DHI Centre of Excellence on Advanced Manufacturing Technology

Education

- PhD in Materials Engineering, Department of Materials Engineering, Indian Institute of Science – IISc Bangalore (August 2006 - November 2011)
- M. Tech. in Materials Engineering from Department of Materials and Metallurgical Engineering, Indian Institute of Technology- IIT Kanpur (August 2003 - May 2005).
- B. Tech. in Ceramic Technology, College of Ceramic Technology, Calcutta University (August 1999 – July 2003).

Previous Employment

- Guest Scientist at Institute for Materials, Faculty of Mechanical Engineering, Ruhr University Bochum, Germany (May 2018 - July 2018)
- Visiting faculty at University of Tennessee Bredesen Center, Knoxville, USA (June 2016 to July 2016)
- Post-doctoral Research Associate in Mechanical Characterization and Mechanics Group at Materials Science and Technology Division, Oak Ridge National Laboratory (ORNL), Oak Ridge, USA (November 2013 to October 2015).
- Post-doctoral Researcher at Institute for Materials Science and Engineering (IWW), Department of Mechanical Engineering, Chemnitz University of Technology, Germany (February 2012 – October 2013).
- Post-doctoral Research Associate in Department of Materials Engineering, Indian Institute of Science – IISc Bangalore (August 2011 - January 2012)

- Scientist B Gr. IV(1) in Surface Engineering Division (SED), National Aerospace Laboratories (NAL), Council of Scientific and Industrial Research-CSIR (June 2005 - July 2006).

Honors/Awards

- ***Fulbright-Nehru Academic and Professional Excellence Fellowships 2022-2023*** from United States-India Educational Foundation (USIEF).
- **'TMS – EPD Materials Characterization Best Poster Award (Third Place)'** in TMS Annual Meeting, March 2018
- ***'R&D 100 award (2017)'*** (as a part of the research group from ORNL, USA)
- ***Best poster award*** in the Annual Meeting & Exhibition of TMS in 2017 held in Nashville, USA
- ***'Student Innovative Thesis Award (Doctoral level)'*** from *Indian National Academy of Engineering* (*INAE*) in 2012.
- ***'K.P. Abraham Gold Medal for Best Doctoral Thesis'*** from Indian Institute of Science, Bangalore in 2012.
- ***Best presentation award (Oral)*** in the Annual Technical Meeting (NMD-ATM) of Indian Institute of Metals (IIM) in 2010 held in IISc, Bangalore.
- ***Best presentation award (Oral)*** in the Annual Technical Meeting (NMD-ATM) of Indian Institute of Metals (IIM) in 2009 held in Kolkata.
- ***National Doctoral Fellowship*** from All India Council for Technical Education (AICTE) for carrying out the doctoral research at IISc (2007-2010).
- M. Tech thesis shortlisted for ***'Student Innovative Thesis Award (Masters level)'*** from *Indian National Academy of Engineering* (*INAE*) in 2006.
- ***Best presentation award*** in International Symposium for Research Scholars (ISRS) organized by IIT Madras in 2004.
- Qualified GATE 2003 with AIR XE-47
- ***National scholarship*** for Secondary (Ranked 20th in WBBSE) and Higher Secondary examinations.

Research Expertise

- Processing-microstructure-property correlation in materials
- Glass and glass-ceramics
- Light metals and alloys
- Crystallographic texture evolution and Electron back-scatter diffraction
- Meso- and micro-scale mechanical characterization
- Additive and Laser based manufacturing
- Modelling of mechanical response

Professional services

- ***Project reviewer for***
  - Science and Engineering Research Board, Department of Science & Technology (DST-SERB), India
  - Scheme for Promotion of Academic and Research Collaboration (SPARC), Ministry of Human Resource and Development, Government of India
  - Excellence initiative of the German Federal and State Government, RWTH Aachen, Germany
- ***Journal reviewer for***
  - Scientific Reports (A Nature series open-access publication)
  - Journal of Materials Research
  - Materials Science and Engineering A
  - Metallurgical and Materials Transaction A
  - Materials Characterization
  - Journal of Alloys and Compounds
  - Materials and Design
  - Intermetallics
  - Journal of Materials Science
  - Transaction of Indian Institute of Metals
  - Indian Journal of Engineering & Materials Sciences
  - Bulletin of Materials Science
  - Chinese Journal of Aeronautics
- ***Past and present membership of professional societies***
  - The Minerals, Metals & Materials Society (TMS)
  - ASM International
  - Deutsche Gesellschaft für Materialkunde (DGM)
  - Materials Advantage Chapter of IISc, Bangalore
  - Indian Institute of Metals (IIM)
  - Indian Ceramic Society

Journal Publications (in chronological order)

1. B. Aashranth, A. Mahato, M. Arvinth Davinci, D. Samantaray, **Shibayan Roy**, V. Karthik, Dynamic failure in additively manufactured polylactic acid: influence of directionality and build configuration, ***Journal of Metals, Under Review, 2023***.

2. G.K. Jana, S. Bera, R. Maity, T. Maity, A. Mahato, **Shibayan Roy**, H. Mohapatra, B.C. Samanta, Evaluation of mechanical and thermal properties of a natural mat fiber reinforced modified epoxy, ***Pigment & Resin Technology: The international***

journal of colorants, polymers and colour applications*, *Under Review, 2023.

3. S. Basu, A.C. Arohi, A. Mahato, D. Chakravarty, I. Sen, **Shibayan Roy**, 'Understanding the correlation between composition, microstructure and mechanical properties for spark plasma sintered (SPS) Alumina–Zirconia composites', ***Journal of Materials Engineering and Performance, Under Review, 2023.***

4. P. Nath, F. Scholz, J. Pfetzing, J. Frenzel, G. Eggeler, **Shibayan Roy**, I. Sen, 'Effective microstructural homogenization and its influence on the localized mechanical properties of single crystal Ni-based superalloy CMSX-4', ***Advanced Engineering Materials, Provisionally Accepted, 2023.***

5. M. Garai, **Shibayan Roy,** 'Performance evaluation for Ag & Au nanoparticle containing K_2O-MgO-B_2O_3-Al_2O_3-SiO_2-F glass sealants for SOFC application', ***International Journal of Ceramic Engineering and Science, Published Online, 2023.***

6. **Shibayan Roy,** A. Sharma, A Chaudhuri, Y. Huang, T. G. Langdon, S. Suwas, 'Microstructure evolution and mechanical response of a boron-modified Ti-6Al-4V alloy during high-pressure torsion processing', ***Materials Science and Engineering A, 860 (2022) 144124.***

7. S. Sahoo, O. Licata, B. Mazumder, **Shibayan Roy,** 'Novel insights on the atomic scale spatial distributions of substitutional alloying and interstitial impurity elements in Ti-6Al-4V alloy', ***Journal of Alloys and Compound, 907 (2022) 164511***.

8. S Sahoo, A. Joshi, V. K. Balla, M. Das, **Shibayan Roy,** 'Site-dependent microstructure, porosity and mechanical properties of LENS™ processed Ti-6Al-4V alloy', ***Materials Science and Engineering A, 820 (2021) 141494.***

9. E. Hoar, S. Sahoo, M. Mahdavi, S. Liang, **Shibayan Roy**, H. Garmestani, 'Statistical modeling of microstructure evolution in a Ti-6Al-4V alloy during isothermal compression', ***Acta Materialia, 210 (2021) 116827***.

10. M. Garai, B Karmakar, **Shibayan Roy**, 'Cr^{+6} controlled nucleation in SiO_2-MgO-Al_2O_3-K_2O-B_2O_3-F glass sealant (SOFC)', ***Frontiers in Materials, 7 (2020) 1-15.***

11. B. K. Milligan, **Shibayan Roy**, C. S. Hawkins, L.F. Allard, A. Shyam, 'Impact of microstructural stability on the creep behavior of cast Al–Cu alloys', ***Materials Science and Engineering A, 772 (2020) 138697.***

12. A. Shyam, **Shibayan Roy,** D. Shin, L.F. Allard, Y. Yamamoto, J. R. Morris, B. Mazumder, J. D. Poplawsky, J. C. Idrobo, A. Rodriguez, T. R. Watkins, J. A. Haynes, 'Extreme microstructural stability at elevated temperature in cast aluminum-copper alloys', ***Materials Science and Engineering A, 765 (2019) 138279.***

13. M. Garai, A. K. Maurya, **Shibayan Roy**, 'Zn^{2+}-controlled crystallization and microstructure in K-Li-Mg-B-Si-Al-F glass', ***MRS Advances (2018) 1-9.***

14. **Shibayan Roy,** S. Suwas, **'**Unique texture transition during sub β-transus annealing of warm-rolled Ti-6Al-4V alloy: Role of orientation dependent spheroidization', ***Scripta Materialia, 154 (2018) 1-7.***

15. I. Sen, **Shibayan Roy**, M. F.-X. Wagner, 'Indentation response and structure-property correlations in a bimodal Ti-6Al-4V alloy', ***Advanced Engineering Materials, 19 (2017) 1-12***.

16. D. Shin, **Shibayan Roy**, T. R. Watkins, A. Shyam, 'Lattice mismatch modeling of Aluminum alloys', ***Computational Material Science, 138 (2017) 149-159***.

17. P. Shower, **Shibayan Roy**, C. S. Hawkins, A. Shyam, 'The effects of microstructural stability on the compressive response of two cast Aluminum alloys up to 300^{o}C', ***Material Science and Engineering A, 700 (2017) 519-529.***

18. **Shibayan Roy,** Satyam Suwas, 'Orientation dependent spheroidization response and macro-zone formation during sub β-transus processing of Ti-6Al-4V alloy', ***Acta Materialia, 134 (2017) 283-301.***

19. **Shibayan Roy,** L. F. Allard, A. Rodriguez, T. R. Watkins, A. Shyam, 'Comparative evaluation of cast Aluminum alloys for automotive cylinder heads: Part I – Microstructure evolution', ***Metallurgical and Materials Transaction A*, 48 (2017) 2529-2542.**

20. **Shibayan Roy,** L. F. Allard, A. Rodriguez, W.D. Porter, A. Shyam, 'Comparative evaluation of cast Aluminum alloys for automotive cylinder heads: Part II – Mechanical and thermal properties', ***Metallurgical and Materials Transaction A*, 48 (2017) 2543-2562.**

21. Aashranth B, **Shibayan Roy,** S. Suwas, 'Effect of hypoeutectic boron modification on the dynamic properties of Ti-6Al-4V alloy', ***Journal of Materials Research, 31 (2016) 2804-2816.***

22. **Shibayan Roy,** G. Kannan, S. Suwas, M. K. Surappa, 'Effect of extrusion ratio on the microstructure and mechanical properties of $(Mg/AZ91)_m$-SiC_p composite', ***Material Science and Engineering A, 624 (2015) 279-290.***

23. S.T. Aruna, **Shibayan Roy,** A. Sharma. G. Savitha, V.K. William-Grips, 'Cost-effective wear and oxidation resistant electrodeposited Ni-pumice coating', ***Surface and Coatings Technology, 251 (2014) 201-209***.

24. **Shibayan Roy**, S. Suwas, 'Enhanced ductility of Ti-6Al-4V-0.1B alloy under superplastic deformation conditions by means of dynamic globularization', ***Materials & Design, 58 (2014) 52-64.***

25. **Shibayan Roy,** S. Suwas, 'On the absence of shear cracking and grain boundary cavitation in secondary tensile regions of Ti-6Al-4V-0.1B alloy during hot (α+β)-compression', ***Philosophical Magazine, 94(5) (2014) 446-463.***

26. **Shibayan Roy**, S. Suwas, 'Crystallographic texture and microstructure evolution during hot compression of Ti-6Al-4V-0.1B alloy in the (α+β) regime', ***Philosophical Magazine, 94(4) (2014) 358-380.***

27. **Shibayan Roy**, S. Suwas, 'Microstructure and texture evolution during sub-transus thermo-mechanical processing of Ti-6Al-4V-0.1B alloy: Part I. Hot rolling in (α+β) phase field', ***Metallurgical & Materials Transaction A, 44 (2013) 3303-3321.***

28. **Shibayan Roy**, S. Karanth, S. Suwas, 'Microstructure and texture evolution during sub-transus thermo-mechanical processing of Ti-6Al-4V-0.1B alloy: Part II. Static annealing in (α+β) regime', ***Metallurgical & Materials Transaction A, 44 (2013)***

3322-3336.

29. **Shibayan Roy**, S. Suwas, 'Deformation mechanisms during superplastic testing of Ti-6Al-4V-0.1B alloy', ***Materials Science and Engineering A, 574 (2013) 205-217.***

30. **Shibayan Roy,** S. Suwas, **'**The influence of temperature and strain rate on the deformation response and microstructural evolution during (α+β) hot compression of Ti-6Al-4V-0.1B alloy', ***Journal of Alloys and Compounds, 548 (2013) 110–125.***

31. P. Venkatachalam, **Shibyan Roy,** B. Ravisankar, V. Thamos Paul, M. Vijayalakshmi, S. Suwas, 'Effect of processing routes on the evolution of texture heterogeneity in 2014 Aluminium alloy deformed by equal channel angular pressing (ECAP)', ***Materials Science & Technology, 28 (2012) 1445-1458***.

32. **Shibayan Roy,** Nataraj B. R., S. Suwas, S. Kumar, K. Chattopadhyay, 'Microstructure and texture evolution during accumulative roll bonding of aluminium alloys AA2219/AA5086 laminates', ***Journal of Materials Science, 47 (2012) 6402-6419***.

33. **Shibayan Roy**, S. Suwas, S. Tamirisakandala, R. Srinivasan, D.B. Miracle, 'Microstructure and texture evolution during β extrusion of hypoeutectic boron modified Ti-6Al-4V alloy', ***Materials Science & Engineering A, 540 (2012) 152-163.***

34. P. Venkatachalam, **Shibayan Roy**, V. Thomas Paul, M. Vijayalakshmi, B. Ravisankar, S. Suwas, 'The role of processing routes on the evolution of microstructure and texture heterogeneity during ECAP of Al-Cu alloy', ***Materials Science Forum, 702-703 (2012) 113-118.***

35. **Shibayan Roy**, Nataraj B. R., S. Suwas, S. Kumar, K. Chattopadhyay, 'Accumulative roll bonding of aluminium alloys 2219/5086 laminates: Microstructural evolution and tensile properties', ***Materials & Design, 36 (2012) 529-539.***

36. **Shibayan Roy**, S. Singh D., S. Suwas, S. Kumar, K. Chattopadhyay, 'Microstructure and texture evolution during accumulative roll bonding of aluminium alloy AA5086', ***Materials Science & Engineering A, 528 (2011) 8469-8478.***

37. **Shibayan Roy**, V. Tungla, S. Suwas, 'Effect of Hypoeutectic Boron Addition on the β-transus of Ti-6Al-4V Alloy', ***Metallurgical & Materials Transaction A, 42 (2011) 2535-254 1.***

38. **Shibayan Roy**, S. Suwas, S. Tamirisakandala, D.B. Miracle, R. Srinivasan, 'Development of solidification microstructure in boron modified alloy Ti-6Al-4V', ***Acta Materialia, 59 (2011) 5494-5510.***

39. P. Venkatachalam, **Shibayan Roy**, B. Ravisankar, V. Thomas Paul, M. Vijayalakshmi, S. Suwas, 'Texture evolution in an Al–Cu alloy during equal channel angular pressing: the effect of starting microstructure', ***Journal of Materials Science, 46 (2011) 6518-6527.***

40. A. Sarkar, **Shibayan Roy**, S. Suwas, 'X-ray diffraction line profile analysis of deformation microstructure in boron modified Ti–6Al–4V alloy', ***Materials***

Characterization, 62 (2011) 35-42.

41. **Shibayan Roy**, A. Sarkar, S. Suwas, 'On characterization of deformation microstructure in Boron modified Ti–6Al–4V alloy', ***Materials Science & Engineering A, 528 (2010) 449-458.***
42. S.R. Dey, **Shibayan Roy,** S. Suwas, J.J. Fundenberger, R.K. Ray, 'Annealing response of the intermetallic alloy Ti–22Al–25Nb'**,** ***Intermetallics, 18 (2010) 1122-1131.***
43. **Shibayan Roy**, B. Basu, 'Hardness properties and microscopic investigation of crack–crystal interaction in SiO_2–MgO–Al_2O_3–K_2O–B_2O_3–F glass ceramic system', ***Journal of Materials Science: Materials in Medicine, 21 (2010) 109-122.***
44. **Shibayan Roy,** B. Basu, 'On the development of two characteristically different crystal morphology in SiO_2–MgO–Al_2O_3–K_2O–B_2O_3–F glass-ceramic system', ***Journal of Materials Science: Materials in Medicine, 20 (2009) 51-66.***
45. **Shibayan Roy**, N. Gurao, S. Suwas, S. Tamirisakandala, R. Srinivasan, D.B. Miracle, 'Texture evolution in boron modified Ti-6Al-4V alloy', ***Ceramic Transaction 200 (2008) 585-592.***
46. **Shibayan Roy,** B. Basu, 'Mechanical and tribological characterization of human tooth', ***Materials Characterization, 59 (2008) 747-756.***
47. **Shibayan Roy,** B. Basu, 'In vitro dissolution behavior of SiO_2–MgO–Al_2O_3–K_2O–B_2O_3–F glass–ceramic system', ***Journal of Materials Science: Materials in Medicine, 19 (2008) 3123-3133.***
48. **Shibayan Roy**, B. Basu, 'Microstructure development in machinable mica based dental glass-ceramics', ***Trends in Biomaterials & Artificial Organs, 20 (2006) 90-100.***
49. S. Maitra, **Shibayan Roy**, A.K. Bandhyapadhyay, 'Synthesis of mullite from calcined alumina, silica and Al powder', ***Industrial Ceramics 24 (2004) 39-41.***

Conference Publications

1. A. Shyam, S. Hawkins, **Shibayan Roy**, S. Dryepondt, D. Erdman, B. Pint, P. Maziasz, "The effect of steam on the elevated temperature high cycle fatigue life of HAYNES 282® superalloy", ***(invited) paper IMECE2014-37982, Proceedings of the ASME 2014 Int. Mech. Eng. Congress & Exposition IMECE2014, pp. V014T11A007, Nov. 14-20, 2014, Montreal, Quebec, Canada.***
2. A. Sabau, W. D. Porter, A. Shyam, **Shibayan Roy**, 'Process simulation role in the development of new alloys based on integrated computational material science and engineering', ***Proceedings of ASME 2014 International Mechanical Engineering Congress & Exposition, 2014***.
3. **Shibayan Roy,** S. Suwas, S. Tamirisakandala, R. Srinivasan, D.B. Miracle, 'Microstructure and texture evolution during β processing of hypoeutectic boron modified Ti-6Al-4V Alloy', ***Proceedings of The 12th World conference on Titanium 2011, vol. 1, 689-693.***
4. **Shibayan Roy**, S. Suwas, S. Tamirisakandala, R. Srinivasan, D.B. Miracle, 'Processing response of boron modified Ti-6Al-4V alloy in (α+β) working regime', ***Supplemental Proceedings TMS 2009, vol. 3, 63-70.***

5. **Shibayan Roy**, N. Gurao, S. Suwas, S. Tamirisakandala, R. Srinivasan, D.B. Miracle, 'Texture evolution in boron modified Ti-6Al-4V alloy', **Proceedings of the 15th International Conference on Textures of Materials (ICOTOM 15), 2008**.
6. **Shibayan Roy**, 'Grain refined boron modified Ti-6Al-4V alloy: Role of Ti-B compound in texture evolution', ***Proceedings of International Symposium for Research Scholars (ISRS) 2008, 203-207***.
7. **Shibayan Roy**, 'Microstructure evaluation of machinable mica-based glass ceramics for dental applications', ***Proceedings of International Symposium for Research Scholars (ISRS) 2004.***

Book and book chapter

1. S. Senthil Kumar, M. Thangarasu, Shibayan Roy, S. T. Reddy Aruna, 'Plasma Sprayed Ceramic Coatings for Solid Oxide Fuel Cells', in ***Chapter 10: Advanced Ceramic Coatings for Energy Applications, In Press, Elsevier Publications, 2023.***
2. S. Roy, **Shibayan Roy**, 'New-Age Al-Cu-Mn-Zr (ACMZ) Alloy for High Temperature-High Strength Applications: A Review', in ***Aluminium Alloys - Design and Development of Innovative Alloys, Manufacturing Processes and Applications, InTech Open Publications (2022).***
3. S. Sahoo, **Shibayan Roy,** 'Additive manufacturing of Titanium alloys: Microstructure and texture Evolution, defect formation and mechanical response', ***Chapter 8: Additive manufacturing: A tool for industrial revolution 4.0, Elsevier Publications (2021).***
4. **Shibayan Roy**, "Boron Addition to Titanium Alloys: Microstructure & Texture Evolution", ***LAP Lambert Academic Publishing, Germany, 2016.***
5. S. Suwas, D B Miracle, S Tamirisakandala, R Srinivasan, **Shibayan Roy,** 'Study of crystallographic texture during thermo-mechanical processing of boron modified Ti-alloys', ***Ft. Belvoir: Defense Technical Information Center, USA, 2009.***
6. S. de-Waziers, **Shibayan Roy**, S. Suwas, S. Tamirisakandala, R. Srinivasan, D.B. Miracle, 'Solidification microstructure and texture in grain-refined titanium alloys', ***Microstructure and Texture in Steels, Chapter 33 (2008) 475-483, Springer Publication***.

Patents

- A. Shyam, Y. Yamamoto, D. Shin, **Shibayan Roy,** J. A. Haynes, P. Maziasz, A. Sabau, A. Rodriguez, J. A. Gonzalez, J. Talamantes, L. Zhang, S. Mirmiran, C. Glaspie, "Aluminum alloy compositions and methods of making and using the same", ***US Patent Number US20170335437A1 (Granted in 2018).***