Curriculum Vitae

Name – Dr. Arnab Sarkar, Assistant Professor, NIT Rourkela

Post-doctoral researcher (The University of British Columbia, Okanagan), Post-doctorate (IIT Bombay), PhD (Metallurgy, IIT Kharagpur)

Email address- sarkararnab@nitrkl.ac.in, arnabandroid404@gmail.com arnabpdf68@gmail.com

Objective

- Research professional with experience in raw iron ore characterization and data analysis, metal casting, jet milling, leaching, heat treatment, extractive metallurgy, corrosion, thermomechanical processing, and material characterization that can lead to the improved product and processes.
- A well-disciplined, multitasker and industrious human being with exemplary interpersonal skills, aiming to take new challenges and risks.

Educational Background

Board	School/College/Institute	Division	Year of Passing
PhD	Indian Institute of Technology, Kharagpur	1st	2019
M-Tech	Indian Institute of Technology, Kharagpur	1st	2014
B.E	Bengal Engineering and Science University, Shibpur	1st	2012
ISC	St Augustine's Day School, Shyamnagar	1st	2007
ICSE	St Augustine's Day School, Shyamnagar	1st	2005

Scholastic Achievement

- Secured all India rank of 36 in GATE, 2012.
- Awarded a NPTEL certificate for teaching assistantship in the subject titled as "Introduction on Intellectual Property to Engineers and Technologist".
- Awarded the 1st prize in poster presentation at ICEMME-2016, Dhaka, Bangladesh.
- Awarded 3rd prize in oral presentation at RSD-2018, IIT Kharagpur.

Experience

Research:

Post-Doctoral Research Fellow (The University of British Columbia, 2022-2023)

- Wear studies on high chromium white irons.
- Wear studies on bimetallic hammers and high-Mn steel.
- Structure-property relationship of TiC-reinforced Mn steel.
- Leaching of carbon black powder and subsequently carrying out the in-depth analysis on the size, microstructure and electrochemical analysis.

Post-Doctoral Researcher (IIT Bombay, 2019-2021)

- Corrosion studies on super duplex stainless steel through DLEPR test.
- Structure-property relationship of high entropy alloys.
- Studies on welding defect such as fissures and porosities in the weldments of 316LN austenitic stainless steel.
- Five parameter grain boundary characterization of Fe-P and Fe-Cu alloys through molecular dynamics simulation.
- Reduction and degradation of iron ore: a microstructural perspective – A HOSIM phenomena.

PhD (IIT Kharagpur, 2014-2019)

Title of PhD thesis: **Structure-property relationship in Al added low density medium Mn steel for automotive application**

- Preparation of different kind of specialized steels through melting and casting route.
- Engaged in thermo-mechanical processing and heat treatment of metal and alloys.
- Carried out intensive characterization of the materials through optical, XRD, SEM and TEM analysis.
- Correlating the microstructure with the mechanical properties like, hardness, strength, elongation and toughness.

Technical Skills

- Designing of the alloy composition using softwares viz. Thermo-Calc and Calphad.
- Expertise myself in the area of heat treatment, jet milling, pressurization filtration, leaching of powders, thermomechanical processing and melting and casting of metals and alloys.
- Sound knowledge in the corrosion testing of high carbon steel, Al-alloyed medium Mn steel, austenitic and super duplex stainless steel.
- Can operate instruments like scanning electron microscopy (SEM) coupled with electron back scattered diffraction system (EBSD), X-ray diffraction (XRD), and microhardness tester.
- Limited experience in dilatometry and Gleeble, where the material can be subjected to various thermomechanical processing.
- Acquainted with the technical softwares like Matlab, Aztech, TSL-OIM, X-Pert high score, Vesta, Gwyddion and ability to work in Origin.

Industrial Exposure

- Involved in the steel making, heat treatment, metal working and finally the conditioning processes of various grades of steel at Alloys Steels Plant in Durgapur.

Projects

Development of high chromium white irons for rock crushing applications (***Unicast-University of British Columbia, 2022-till present***)

- The tribological aspects are correlated to the developed microstructure of the alloys.

Development of bimetallic hammers and Mn steel for clinker crusher applications (***Unicast-Syncrude-University of British Columbia, 2022-till present***)

- Comparative investigation of structure-property relationship between high Mn steel and bi-metallic hammers for clinker crusher application.

Carbon black: a prospect for battery application (***Kaltire-University of British Columbia, 2022-till present***)

- The combined effect of leaching process on the electrochemical behavior were investigated.

Structure-property correlation of high entropy alloys (HEAs) (University of North Texas, USA)

- The combined effect of various microstructural features on the tensile properties of HEAs were studied.

Corrosion behavior of super duplex stainless steel (***Sandvik-BARC, 2019-2021***)

- The main objective is to improve the corrosion behavior of super duplex stainless steel in the temperature regime of 600-800˚C.

Effect of hot fissures on the tensile properties of the weldment of austenitic stainless steel (***IGCAR, 2019-2021***)

- Various heat input are employed to improve the mechanical performance of the weldments of austenitic stainless steel.

Simulation of the residual stress (RS) of the heavily deformed HSLA steel (Tata Steel, 2020-2021)

- The simulation study on RS will be carried out using finite element modelling and the findings are correlated with the experimental results.

Reduction and degradation of iron ore: microstructural perspective. (Tata Steel, 2020- till present)

- The higher oxides iron ore are reduced at various reduction time and the microstructural changes are compared and studied in details.

Position of responsibility

- Handled lab classes as TA in material characterization and heat treatment lab both at IIT Kharagpur and IIT Bombay
- Awarded the TA certificate for conducting and coordinating a course titled as “Introduction of Intellectual property to engineers and technologists.

Publications, *Citation: 195, h-index: 7, i10-index: 7*

Journals:

- **A. Sarkar**, S. Sanyal, T.K. Bandyopadhyay, S. Mandal, **Mater. Sci. Eng. A.** 703 (2017) 205–213.
- **A. Sarkar**, S. Sanyal, T.K. Bandyopadhyay, S. Mandal, **Mater. Charact.** 134 (2017) 213–224.
- **A. Sarkar**, S. Sanyal, T.K.Bandyopadhyay, S. Mandal, **Mater. Sci. Tech.** 35 (2019) 2054-2068.
- **A. Sarkar**, S. Sanyal, T.K. Bandyopadhyay, S. Mandal, **Mater. Sci. Eng. A** 767 (2019) 138402.
- **A. Sarkar,** T.K. Bandhyopadhay, **Int. J. Mater. Sci**. 5 (2015) 16–21.
- N. Kisku, **A. Sarkar,** K.K. Ray, S. Mandal, **J. Mater. Eng. Perform.** 27 (2018) 4077-4089.
- R.P. Mahto, S. Anishetty, **A. Sarkar,** O. Mypati, S.K. Pal, J.D. Majumder, **Metals and Materials International**, 25 (2019) 752-767.

- S. Dasari, **A.Sarkar**, A. Sharma, B. Gwalani, D. Choudhuri, V. Soni, S. Manda, I. Samajdar, R. Banerjee, **Acta Materialia** 202 (2020) 448-462.
- MI Khan, Aditya Prakash, HK Mehtani, P Raut, Namit N Pai, **A Sarkar**, MJNV Prasad, S Parida, I Samajdar, **Metallurgical and Materials Transactions A** 52 (2021) 4597–4608.
- R. Rakshit, **A. Sarkar**, S.K. Panda, S. Mandal, **Mater. Sci. Eng. A** 830 (2022) 142267.
- S. Kumar, **A. Sarkar**, Durga Prasad, M. Paliwal, S. Mukherjee, S. Mandal, **Mater. Sci. Eng. A** 835 (2022) 142664.
- **A. Sarkar**, S. Basu, A. B. Pattnaik, B. Nagamani Jaya, S. Karagadde, I. Samajdar, H. Kumar, R. Kumar, R. Mythili, C. Ghosh, A. Dasgupta, S. Albert, **Metallurgical and Materials Transactions A** 53 (2022) 2116-2129.
- **A. Sarkar,** P. Modak, **EDAX Insight** 20 (2022) 12-13.
- M.I. Khan, **A. Sarkar,** H.K. Mehtani, P. Raut, A. Prakash, M.J.N.V. Prasad, I. Samajdar, S. Parida, **Material Chemistry and Physics** 290 (2022) 126623.
- **A. Sarkar**, S. Kumar, B. R. Sudhalkar, R. Mondal, M.I. Khan, A. Mahanti, K. Chandra, V. Kain, I. Samajdar, **Material Characterization** 194 (2022) 112426**.**

Patents:

- S. Kumar, **A. Sarkar**, S. Mukherjee, T.K. Bandyopadhyay, S. Mandal, IN Patent **(Application no:** 201931021155) (**International Classification no:** C22C0038040000) (**Publication Date:** 04/12/2020)- .**Granted.**
- S. Kumar, **A. Sarkar**, D. Nayak, T.K. Bandyopadhyay, S. Mandal, IN Patent **(Application no:** 202031012312**) Granted.**

Some selected Conferences

- **A. Sarkar,** S. Sanyal, S. Mandal and T.K.Bandyopadhyay, TMS-2017 at San Diego, USA.
- **A. Sarkar,** S. Sanyal, S. Mandal and T.K.Bandyopadhyay, MS&T-2018 at Columbus, Ohio, USA.

Declarations

I hereby declare that the information furnished above is true and to the best of my knowledge.