Dr. Suneeti Purohit
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Degree	University	Year
Doctor of Philosophy (PhD)	Swinburne University of Technology, Australia	2016 –2020
Specialization: Mechanical & Product Design Engineering		
Post-Graduation	Indian Institute of Technology Kharagpur, India & Karlsruhe Institute of Technology, Germany	2011 – 2013
Specialization: Metallurgical & Materials Engineering		
Graduation	Indira Gandhi Institute of Technology/BPUT, India	2007 – 2011
Specialization: Metallurgical & Materials Engineering		

WORK EXPERIENCE

- **Commonwealth Scientific and Industrial Research Organization (CSIRO):** Research Scientist, Mineral Resources, Clayton [Feb' 20-Feb' 21]
- **Swinburne University of Technology:** Adjunct Research Fellow, Department of Mechanical and Product Design Engineering [Apr' 20-Feb' 21]
- **Veer Surendra Sai University of Technology (VSSUT):** Assistant Professor, Metallurgy and Materials Engineering Department [June '13- Jul'16]
- **National Institute of Technology (NIT) Raipur:** Adhoc Faculty, Metallurgy and Materials Engineering Department [Jan'14- May'14]
- **O P Jindal University of Technology (OPJU):** Assistant Professor, Metallurgy Department [July'13- Dec'13]

RESEARCH PROJECTS

Postdoctoral Research *(Team: Dr. Keith Vining and Dr. Mark Pownceby from CSIRO, Prof. Geoffrey Brooks and Prof. Akbar Rhamdhani from Swinburne University of Technology)*

Pilot Testing of lime-magnetite pellets (LMPs) Route for Magnetite Agglomeration [Feb'20 - Mar' 21]

- Pilot-scale agglomeration of lime-magnetite pellets (LMPs).
- Analyze the pellet behavior in relation to reducibility, cold crushing strength, low temperature disintegration (using Linder test), high temperature reduction degradation index, softening and melting characteristics, swelling index, industrial basket test (by Midrex or HYL) and weathering.
- Mass and energy balance analysis of LMP route of magnetite agglomeration.
- Understanding reduction behavior of LMPs.

Ph.D. Thesis *(Prof. Geoffrey Brooks and Prof. Akbar Rhamdhani from Swinburne University of Technology and Dr. Mark Pownceby from CSIRO)*

Alternative Processing Route of Magnetite Ore [Aug'16- Feb' 20]

- Invented a lower carbon footprint magnetite agglomeration route that involves the formation of $CaFe_3O_5$/CWF phase in lime-magnetite pellets (LMPs).
- Concept was tested using theoretical and experimental approach to establish CWF formation.
- Post-experimental sample characterization suggested over 80 and 90 wt.% CWF formation with 10 min of reaction at 950 and 1050 °C, respectively.
- Kinetics of the CWF formation was studied. Reducibility and Tumbler Index were analyzed and found comparable to industrial sinters.
- Solar agglomeration of magnetite was tested in solar simulator-reactor setup and the basic chemistry under solar conditions confirmed.

- A solar smelting route of magnetite-coal composite pellet was proposed. Theoretical and experimental investigations resulted over 55 % metallization and 2.5 to 3 years of payback period.

M.Tech. Dissertation *(Prof. Siddhartha Das, IIT Kharagpur & Prof. Horst Hahn, KIT Karlsruhe)*

Synthesis of single crystalline Cu_2O nanowires for electrochemically-gated PMOS transistors [Sep'12- Apr'13]

- Single crystalline Cu_2O nanowires were synthesized in bulk using hydrothermal method.
- Chemistry and morphology were confirmed using several characterization techniques such as XRD, SEM, EDX, FTIR and HRTEM.
- Nanowires were surface treated to remove contaminants and then dispersed on a receiver substrate structured with the passive electrodes, followed by electrode deposition using e-beam lithography, and finally printing of a composite solid polymer electrolyte (CSPE), chosen as the gate insulator.
- The subsequently prepared electrolyte-gated single nanowire field-effect transistors (FETs) showed accumulation mode hole conducting metal-oxide-semiconductor-FETs (MOSFET) behavior with electrical performance parameters among the best Cu_2O nanowire-FETs, confirming its suitability for portable and flexible logic circuits.

Bachelor of Technology Thesis *(Prof. Sandeep K. Sahoo & Prof. Suresh Chandra Pattnaik, IGIT Sarang)*

Effect of austempering on mechanical properties of spheroidised graphite (SG) cast iron [July'10-May'11]

- SG iron samples (from L&T Kansbahal) were austempered at several conditions of temperature (300, 350 and 400 °C) and time (1hr, 2hr, 2.5hr & 3hr).
- Studied the phase and microstructure evolution.
- Measured hardness and toughness of the samples by Brinell hardness test and V-notch Charpy test, respectively.

PROFESSIONAL EXPERIENCE

- Trained several PhD, Master, and undergraduate students at Swinburne University of Technology in building experimental rigs and using existing research facilities.
- Three years of experience in teaching and training undergraduate students for course work and laboratory classes.
- Developed and implemented course structures and lesson plans for several subjects for the newly opened Metallurgical and Materials Engineering Department at VSSUT, Burla.
- Prepared online lecture notes of several subjects like "Material Characterization Techniques", "Introduction to Physical Metallurgy", "Iron Making", "Phase Transformations" and "Materials Engineering" for VSSUT, Burla. https://www.vssut.ac.in/lecture-notes.php?url=metallurgical-materials-engineering
- Was an active member of Departmental Purchase Committee (DPC) and played a key role in establishing several laboratories at VSSUT.
- Organized several QIP (Quality Improvement Program) Short term courses for VSSUT and OPJU.
- Was a faculty advisor of Society of Metallurgical Engineers at both VSSUT and OPJU.

INDUSTRIAL TRAINING

Rourkela Steel Plant (RSP), Rourkela, India [June'09-July'09]

- Extensively analyzed the various units of Sintering Plant (SP-I and SP-II): Raw Material Section, Burden Section and Machine Section
- Studied the processing of Coke Oven Plant (CO), Blast Furnace Section (BF), XRF lab & Steel Melting Shop (SMS-II)

National Aluminium Company (NALCO), Angul, India [Aug'10-Sep'10]

- Studied the operation of Pot Lines, Carbon Area and Fume Treatment Plant (FTP)
- Observed the entire process of ingot & billet casting and compared the Maxicast and Airslip casting technology

TECHNICAL EXPERTISE

- **INSTRUMENTATION PROFICIENCY:** High temperature furnaces, Hardness Testing Machine (Rockwell, Brinell, Nanoindenter), Tensometer, Autoclave, Lithography Machine (LEO 1531), Inert Gas Condensation (IGC), Semiconductor parameter analyzer (Agilent 4156C), Plasmalab reactive Ion etching system, Dynamic light scattering (DLS), Differential Scanning Calorimetry (DSC), Differential Thermal Analysis (DTA), Thermogravimetric Analysis (TGA)
- **CHARACTERIZATION PROFICIENCY:** Optical Microscope, Scanning Electron Microscopy (SEM), Energy Dispersive X-ray spectroscopy (EDX), Fourier Transform Infrared spectroscopy (FTIR), X-Ray powder diffractometer (XRD), In-situ XRD.
- **SOFTWARE PROFICIENCY:** FactSage Thermodynamic Package, Outotec HSC Chemistry Software, Origin, Thermocalc, ImageJ, Rietveld Software (SUITE TOPAS), ELPHY PLUS (Design software for lithography), DigitalMicrograph (for indexing SAD pattern).

PROMINENT COURSES TAUGHT

- Metallurgical Thermodynamics & Kinetics
- Transport Phenomena
- Ferrous and Nonferrous Extractive Metallurgy
- Materials Characterization Techniques

AWARDS AND SCHOLAR/SHIPS

HDR Publication Award: Offered by Swinburne University of Technology, Australia [Dec' 19]
Winner of Amplify Ignite 2019: Offered by AMP Capital and Hallis Group [Nov' 19]
SUPRA Scholarship: Offered by Swinburne University of Technology, Australia [Aug' 16 – Aug' 19]
DAAD Scholarship: Offered by the government of Germany [Sept'12-Mar'13]
HRD Scholarship: Graduate fellowship by Human Resource & Development Ministry, India [July'11-June'13]
National Rural Talent Scholarship: Offered by the state government of Orissa [Aug'07]

SEMINARS/ WEBINARS/CONFERENCES

1. "Sustainable Environmental Engineering Practices" –Webinar organized by National Institute of Technology (NIT) Rourkela, India. [Sept' 20]
2. "Prospects and Opportunities for Women in Metallurgy and Materials" – Webinar organized by Centre of Steel Technology & Product Development (CSTPD) and Jindal Steel & Power Ltd, India. [Aug' 20]
3. "Recent Advances in Process Metallurgy" – Faculty Development Program organized by OPJU in association with ASM India and IIM India Chapter. [July' 20]
4. "4th Australian Ironmaking Materials Symposium" – Jointly organized by the ARC Iron Ore and Steel Hubs at CSIRO, Pullenvale, Brisbane. [Oct' 19]
5. "The Iron & Steel Technology Conference and Exposition" – Organized by AIST at Pittsburg, Pennsylvania, USA. [May 19]
6. "Victoria Student Seminar" – Organized by Australian X-Ray Analytical Association at CSIRO, Clayton, Melbourne [Oct' 18]
7. "6th Australia-China-Japan Joint Symposium on Iron and Steel Making", organized at Monash University, Melbourne, Australia. [Nov'16]
8. "Asia Pacific Solar Research Conference" – organized at Australian National University. [Nov' 16]
9. "DPG Spring Meeting 2013" – organized by Deutsche Physikalische Gesell¬schaft e. V. (DPG) at University of Regensburg, Germany. [Mar'13]
10. "Advances in Steel, Power and Construction Technology" – Seminar organized at OPJU, India. [Jan'14]
11. "Sustainable Technologies" – Seminar organized by Indian Institute of Metals**,** Angul Chapter. [Aug'10]
12. "Global recession & its impact on industries and technical education" – Seminar organized by IGIT Sarang, India [Oct'09]

RESEARCH PUBLICATIONS AND PATENTS

Patents:

1. S. Purohit, G. Brooks, M. A. Rhamdhani, M. I. Pownceby, K. Vining, "Ironmaking Feedstock", AU Patent: 2019203137 (Filed).
2. S. Purohit, G. Brooks, M. A. Rhamdhani, M. I. Pownceby, K. Vining, "Ironmaking Feedstock", US Patent App. 62/842,567 (Filed).

Journals:

1. S. Purohit, G. Brooks, M. A. Rhamdhani, M. I. Pownceby, N. Webster, "Effect of Impurity Oxides on CWF ($CaFe_3O_5$) Formation in Lime Magnetite Pellets - Part I: Thermodynamic Assessments and Experimental Investigations", Ironmaking & Steelmaking, 2020, DOI: 10.1080/03019233.2020.1774222.
2. S. Purohit, G. Brooks, M. A. Rhamdhani, M. I. Pownceby, A. Torpy, "Effect of Impurity Oxides on CWF ($CaFe_3O_5$) Formation in Lime Magnetite Pellets – Part II: Microstructural Analysis and Physical and Mechanical Testing", Ironmaking & Steelmaking, 2020, DOI: 10.1080/03019233.2020.1774251.
3. S. Purohit, G. Brooks, M. A. Rhamdhani, M. I. Pownceby, N. Webster, "Analyses of CWF ($CaFe_3O_5$) Phase Formation in Lime Magnetite Pellets", Ironmaking & Steelmaking, May 2019. https://doi.org/10.1080/03019233.2019.1623594.
4. S. Purohit, G. Brooks, M. A. Rhamdhani, M. I. Pownceby, N. Webster, "Alternative processing routes for magnetite ores", Ironmaking & Steelmaking, Jan 2019. https://doi.org/10.1080/03019233.2019.1569811.
5. S. Purohit, B. Ekman, R. Mejias, M. A. Rhamdhani, G. Brooks, "Solar processing of composite iron ore pellets: Preliminary assessments", Journal of Cleaner Production, vol. 205, no. 20, pp 1017-1028, 2018. https://doi.org/10.1016/j.jclepro.2018.09.112.
6. S. Purohit, A. Rhamdhani, and G. Brooks, "Mass and energy analysis of composite pellet process," Ironmaking \& Steelmaking, pp. 1–6, 2018.
7. A. Stoesser, F. von Seggern, S. Purohit, B. Nasr, R. Kruk, S. Dehm, D. Wang, H. Hahn, and S. Dasgupta, "Facile fabrication of electrolyte-gated single-crystalline cuprous oxide nanowire field-effect transistors," Nanotechnology, vol. 27, no. 41, p. 415205, 2016.

Conference Proceedings:

1. S. Purohit, M.A. Rhamdhani, G. Brooks, M. I. Pownceby, N. Ware, "Lime-Magnetite Pellets for Iron-making", AISTech conference proceedings, Pittsburg, Pennsylvania, USA, 2019.
2. S. Purohit, M.A. Rhamdhani, G. Brooks, M. I. Pownceby, "Alternative Processing Routes for Magnetite Ores", AISTech conference proceedings, Philadelphia, Pennsylvania, USA, 2018.

EXTRA CURRICULAR

- Member of Materials Advantage (AIST, ASM & TMS)
- Life member of **Indian Society for Technical Education**
- Member of technical body of **Indian Institute of Metal** (IIM) Angul Chapter
- Pursued **A1 level German Language** (conversational) Course of 56 hrs at KIT Karlsruhe

HOBBIES

- Yoga and Physical Exercise
- Travelling
- Information Research on Current Trends
- Watching Movies

REFERENCES (Mode of Contact: Through Email)

- Prof. Geoffrey Brooks, Swinburne University of Technology, +61 488384140, gbrooks@swin.edu.au.
- Prof. Akbar Rhamdhani, Swinburne University of Technology, +61 423620908, arhamdhani@swin.edu.au
- Dr. Mark I Pownceby, CSIRO, Clayton, +61 434551367, mark.pownceby@csiro.au