

Dr. Aarti Kumari

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ACADEMIC DETAILS

Course	Year	Name of the Institution	CGPA
Ph.D (Engineering Sciences)	2021	Academy of Scientific & Innovative Research (AcSIR)	10.0
M.Tech (Materials & Metallurgical Engg.)	2014	Academy of Scientific & Innovative Research (AcSIR)	9.47
B.Tech. (Chemical Engineering)	2011	BIT Sindri, Dhanbad	8.71

Ph.D Thesis: Hydrometallurgical Processing of Spent NdFeB Magnet for Recovery of Rare Earths under the guidance of Dr. S. K. Sahu, Senior Principal Scientist, CSIR-NML, Jamshedpur.

M.Tech. Thesis: Green Separation of Rare Earth Metals Using Ionic Liquid as Extractant under the guidance of Dr. S. K. Sahu (Senior Principal Scientist, CSIR-NML, Jamshedpur) and Dr. B. D. Pandey (Former Chief Scientist, CSIR-NML, Jamshedpur).

WORK EXPERIENCE

From	To	Designation	Organization
Mar, 2022	Till now	Assistant Professor	Indian Institute of Technology (ISM), Dhanbad
Sep, 2019	Mar, 2022	Senior Scientist	CSIR-National Metallurgical Laboratory, Jamshedpur
Sep, 2015	Sep, 2019	Scientist	CSIR-National Metallurgical Laboratory, Jamshedpur
Sep, 2012	Aug, 2014	Trainee Scientist	CSIR-National Metallurgical Laboratory, Jamshedpur

RESEARCH INTEREST

- Extractive Metallurgy, Non-Ferrous Metal Extraction, Hydrometallurgy, Waste processing, Recycling, Rare earths extraction, NdFeB magnet processing, Metal separation and purification.

PROFESSIONAL RECOGNITION/ AWARD

Sl.No	Name of Award	Awarding Agency	Year
1.	IEI Young Engineers Award 2023-24 in Metallurgical & Materials Engineering discipline	The Institution of Engineers (India)	2024

2.	Best Oral Presentation Award	International Conference on Management and Recycling of Metallurgical Waste (MetWaste-2023) held at IIT(BHU), Varanasi during February 27-28, 2023.	2023
3.	AWSAR Award	Department of Science and Technology (DST), Government of India	2019
4.	1 st Prize for Paper Presentation	32 nd National convention of Metallurgical and Materials Engineers and National Seminar on “Advances in Engineering Materials for Sustainable Development” during 18-19th Jan, 2019	2019
5.	1 st Prize for Paper Presentation	Microsymposium on 'Recent Developments in Mineral Processing and Mechanical Activation of Solids' on 22nd February, 2019	2019
6.	Best poster presentation award	National Conference on Critical & Strategic Materials for Advanced Technologies, held at Munnar, Kerala during March 9-11, 2017	2017

TEACHING EXPERIENCE AT IIT(ISM), Dhanbad

- Courses taught in IIT (ISM), Dhanbad:
 - Unit Operations in Extractive Metallurgy (FMC 504)
 - Extractive Metallurgy (FMC 302)
 - Extractive Metallurgy Laboratory (FMC 351)
 - Process Metallurgy Laboratory (FMC 552)
 - Non Ferrous Extractive Metallurgy (FMD 463)
 - Fine Particle Processing Laboratory (FMC 253)

INVOLVEMENT IN R&D PROJECTS AT IIT(ISM), Dhanbad

- Received project entitled “*Rare earth elements identification and its recovery in Indian coals and coal by-products*” of Rs.15,74,400/- for National Post-Doctoral Fellowship (NPDF) by SERB in November, 2022 for 2 years. (Project no. DST(SERB)(354)/2022-2023/951/FMME/NPDF)
- Member of project implementation group for FIST (Fund for Improvement of S&T Infrastructure) project awarded by DST of Rs. 117 Lakhs in December, 2022.
- Co-PI of the project entitled “*Characterization and beneficiation studies on auriferous quartzite ore for producing concentrate for recovery of gold*” of Rs. 4.72 Lakhs sponsored by Manmohan Mineral Industries Pvt. Ltd.
- Co-PI of the project entitled “*Sampling and analysis of 40,000 MT Slurry from Heap no. ‘B’, Heap no. ‘C’ and Heap no. ‘E’ at Moonidih Coal Washery*” of Rs. 2.59 Lakhs sponsored by Bharat Coking Coal Limited (BCCL).

INVOLVEMENT IN R&D PROJECTS AT CSIR-NML, Jamshedpur

- **Project leader of an Indo-French project** entitled “To develop an effective extraction and separation technology to selectively extract rare earth elements” in collaboration with Marcoule Institute for Separation Chemistry (ICSM), France and Terra Nova Development (Industry, France) **sponsored by Indo-French Centre for the Promotion of Advanced Research (CEFIPRA).**

- **Visited Marcoule Institute for Separation Chemistry (ICSM), France and TND, France for Indo-French project of CEFIPRA during September 13-30, 2019 to strengthen the International collaboration of CSIR-NML with French collaborators.**
- Development of process flowsheet for the preparation of Mn_3O_4 from low grade manganese ore **sponsored by J.K. Mineral.**
- A network project on "Sustainable technologies for the Utilization of Rare Earths (SURE)" **under 12th five year plan project** sponsored by Government of India (from March 2013 to March 2017).
- Pilot scale process for recycling of metals/materials from E-waste **sponsored by Government of India.**
- Development and transfer of a technology for the production of electrolytic zinc powder from zinc dross **sponsored by Kanpur Metal Processors Pvt. Ltd., Kanpur.**
- Evaluation and characterization of band by band coal analysis of Asansol Coalfield area **sponsored by CMPDIL.**
- Scientific Investigation on Hydro and Electro-chemical dissolution of scrap magnets of wind turbines for the recovery of rare earth metals and other valuable products **(In-house project).**
- Green separation of rare earth metals using Ionic Liquid as extractant **(In-house project).**
- Recovery of germanium from secondary resources **sponsored by DRDO.**

PROCESS/ PRODUCT DEVELOPMENT

- Recovery of high pure terbium oxide (Tb_4O_7) from phosphor powder of waste fluorescent lamps
- Development of an energy efficient process for the selective leaching of rare earths from spent NdFeB magnet using chlorination roasting and water leaching method
- Development of an electrochemical leaching process for the recovery of rare earths from spent NdFeB magnet
- Development of process flowsheet for the preparation of Mn_3O_4 from J. K. Mineral manganese ore
- Solvent extraction process for the separation of lanthanides by using ionic liquid (Cyphos IL 104)
- Development of a process to recover samarium and cobalt from SmCo magnet swarf
- Recovery of rare earth oxide and iron oxide from spent NdFeB magnet by oxidative roasting and acid leaching process
- Development of process for the production of electrolytic zinc powder from zinc dross

PATENTS

No	Title	Country	Patent no.	Granted on	Inventors
1.	A novel electrochemical method for the recovery of metal values from spent NdFeB magnet	India	510829	14-02-2024	Aarti Kumari, Dipali, N. S. Randhawa, S. K. Sahu
2.	An improved process for selective recovery of rare earths from waste NdFeB magnet	India	519997	05-03-2024	Aarti Kumari, N. S. Randhawa, S.K. Sahu

3.	A process for the recovery of high pure terbium oxide (Tb_4O_7) from phosphor powder of waste fluorescent lamps	India	518786	04-03-2024	S. K. Sahu, Aarti Kumari , Pramanik Swati
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RESEARCH PUBLICATIONS

No.	Details of publications	Journal/vol./page no.	Year	Impact Factor
1.	Sukhbaatar, T., Piton, R., Giusti, F., Arrachart, G., Duvail, M., Kumari, Aarti , Daware, S., Gupta, S., Goverapet, S., Sahu, S. K., Rai, B., Pellet-Rostaing, S. Lipophilic EDTA-based ligands in different diluents for the extraction of rare earths: Preliminary results with Nd(III), Dy(III) and Pr(III) in chloride and nitrate media.	Hydrometallurgy , 231, 106415	2024	4.8
2.	S. Pramanik, Aarti Kumari , M. K. Sinha, B. Munshi, S. K. Sahu. Extraction of metal values from iron-rich mine tailings via chloridized roasting and water leaching.	Waste Management Bulletin , 2(2), 113-121	2024	-
3.	Aarti Kumari , S. K. Sahu. A comprehensive review on recycling of critical raw materials from spent neodymium iron boron (NdFeB) magnet	Separation & Purification Technology , 317, 123527	2023	8.6
4.	S. Pramanik, Aarti Kumari , M. K. Sinha, B. Munshi, S. K. Sahu. Valorization of phosphor powder of waste fluorescent tubes with an emphasis on the recovery of terbium oxide (Tb_4O_7)	Separation & Purification Technology , 322, 124332	2023	8.6
5.	Aarti Kumari , Dipali, N. S. Randhawa, S. K. Sahu., 2021. Electrochemical treatment of spent NdFeB magnet in organic acid for recovery of rare earths and other metal values.	Journal of Cleaner Production , 309, 127393	2021	11.1
6.	Aarti Kumari , R. Raj, N. S. Randhawa, S. K. Sahu., 2021. Energy efficient process for recovery of rare earths from spent NdFeB magnet by chlorination roasting and water leaching.	Hydrometallurgy , 201, 105581	2021	4.8
7.	Aarti Kumari , K. K. Sahu, S.K. Sahu., 2019. Solvent Extraction and Separation of Nd, Pr and Dy from Leach Liquor of Waste NdFeB Magnet Using the Nitrate Form of Mextral (R) 336At in the presence of Aquo-Complexing Agent EDTA.	Metals , 9 (2), 269.	2019	2.9
8.	R. Raj, D. K. Sahu, Aarti Kumari , R. Prasad, S. Ranganathan., 2019. Carbothermic Reduction of Iron Oxide Waste Generated During the Processing of Ilmenite.	Transactions of the Indian Institute of Metals , 72(1), 11-16.	2019	1.6
9.	Aarti Kumari , M. K. Sinha, S. Pramanik, S. K. Sahu, 2018. Recovery of rare earths from spent	Waste Management , 75,486-498.	2018	8.1

	NdFeB magnets of wind turbine: Leaching and kinetic aspects.			
10.	M. K. Sinha, S. Pramanik, Aarti Kumari , S. K. Sahu, L. B. Prasad, M. K. Jha, K. Yoo, B. D. Pandey, 2017. Recovery of value added products of Sm and Co from waste SmCo magnet by hydrometallurgical route.	Separation and Purification Technology , 179, 1-12.	2017	8.6
11.	Aarti Kumari , M. K. Sinha, S. K. Sahu, B. D. Pandey, 2016. Solvent Extraction and Separation of Trivalent Lanthanides Using Cyphos IL 104, A Novel Phosphonium Ionic Liquid as Extractant.	Solvent Extraction and Ion Exchange , 34(5), 469-484.	2016	2.0
12.	Aarti Kumari , M. K. Sinha, S. K. Sahu, B. D. Pandey, 2016. Investigation of a novel ionic liquid, Cyphos IL 104 for the solvent extraction of mineral acids.	Hydrometallurgy , 165(1), 159-165.	2016	4.8

ORAL PAPER PRESENTATIONS

- 6 Papers published in conference proceedings
- 15 oral presentations in international, national conferences and seminars.

FELLOWSHIPS OF PROFESSIONAL SOCIETIES

- Life membership of Indian Institute of Metals (IIM)
- Life membership of Indian Institute of Mineral Engineers (IIME)
- Life membership of The Institution of Engineers (India) (IEI)

CONTRIBUTION TO CORPORATE MANAGEMENT AND RESPONSIBILITIES

- DUGC Convener of FMME Department in IIT(ISM), Dhanbad
- Member of DAC, DPGC, DPAC and DFSC in IIT(ISM), Dhanbad
- Committee member of **Standing publication, Ethics and Scientific Vigilance (SEC)** in CSIR-NML
- **Organizing member of various national and international conferences/events** organized by CSIR-NML such as International Conference on Processing of Lean Grade and Urban Ores (IC-LGO-2015), Behind the Teacher's Desk (BTDD) in year 2016 to 2019, National seminar on Advances in Engineering Materials for Sustainable Development (AMESD-2019), Prof. S. N. Sinha Memorial Materials and Metallurgy Event *etc.*
- Organizing member of **Entrepreneurship Development on E-Waste Management (EDEM)** under CSIR Integrated Skill Training Initiatives by CSIR-NML
- Organizing member of the National Level Exhibition "CAPSULE" in CSIR-NML during September 21-23, 2017.

- Organizing member of "**CSIR- Platinum Jubilee Lecture Series**" in CSIR-NML.
- Member of Editorial Board for publication of CSIR-NML **Hindi magazine "SAMANVAY"**.