



TATA STEEL

Webinar

on

*Recent Advances
in
Critical Materials*

23rd November 2022

*Organised
by*

*Ferro Alloy Minerals Research Group
Research and Development Division
Tata Steel Ltd.,
Jamshedpur, India*

In case of any queries, please contact—Dr Sunil Kr Tripathy, +91 9204058167, Email: sunilk.tripathy@tatasteel.com



TATA STEEL

Webinar program

Program		Time
Introduction and Context setting		9:00-9:10
Prof.Sarma V Pisupati PSU, USA	Examining the Potential for Rare Earth and other Critical Minerals from Secondary Sources for a Sustainable World	9:10-10:10
Dr Krishna. V.Mirji NFC, India	Pressing challenges in implementation of innovative models to support the internal demand of critical materials essential in key crucial strategic sectors	10:10-11:05
Dr. Corby G. Anderson CSM, USA	How The Rare Earths Became Lanthanides Again <i>Cancelled</i>	11:05-12:05
Dr. Shivakumar Angadi CSIR-IMMT, India	A Prelude to the Recovery of Platinum Group of Minerals from the Indian deposits	12:05-13:00
Break (13:00—14:00)		
Professor Lev Filippov UL, France	Recovery of rare earths and rare metals minerals from the mineral processing waste streams	14:00-14:45
	Processing of Li pegmatite using combined technology	14:45 - 15:30
Dr Saeed Farrokhpay AUM, Kuwait	Upgrading Nickel in Laterite Ores	15:30 - 16:20
Dr. Sushanta Kumar Sahu CSIR-NML, India	Recovery of rare earths from spent NdFeB magnets	16:20-17:05
Dr. Rick Q. Honaker UK, USA	Science and Process for Critical Material Recovery from Coal Sources <i>Cancelled</i>	17:05-18:00
End of Webinar		

Biography : Prof.Sarma V Pisupati



Professor
Energy & Mineral Engineering and Chemical Engineering

Director,
Center for Critical Minerals

Contact:
Ph.no: 814.865.0874, 814.880.1241,
Email: sxp17@psu.edu

Pennsylvania State University
College of Earth and Mineral Sciences,
EMS Energy Institute,
United States of America

Sarma V. Pisupati is Professor of Energy and Mineral Engineering, Chemical Engineering, and Director of Center for Critical Minerals at The Pennsylvania State University. He also codirects the Coal Science and Technology Program of the EMS Energy Institute. Sarma was inaugural Chair of the Energy Engineering Program. He earned BS and MS degrees in Chemical Engineering from Osmania University and IIT Kharagpur, respectively, and a Ph.D. degree from The Pennsylvania State University. He has been studying and teaching the issues related to energy and the environment for the past 35 years. He has worked in the industry for five years before joining Penn State. Sarma's main areas of scientific research are chemical kinetics, mass and heat transfer in the combustion of solid fuels; computational fluid dynamic modeling of combustion systems for emission reduction; extraction of geothermal energy integrated with CO₂ sequestration, advanced power generation methods; oxy-fuel combustion; chemical looping combustion; slagging and fouling in gasification; coal and biomass co gasification and extraction of critical and rare earth elements from secondary sources.

He was Principal Investigator (PI) or co-PI on 65 externally funded scientific research projects. He coauthored over 225 research publications and has one US patent. Sarma is very actively involved in professional societies. He was elected a Fellow of the American Chemical Society. His service to professional organizations includes: Co-organizer or Co-chair or Moderator of 25 Scientific and teaching-related Symposia for American Chemical Society, ASME International Fluidized Bed Combustion Conferences, Annual International Pittsburgh Coal Conferences and American Society of Engineering Education, Associate Editor, ASME Journal of Energy Resources and Technology, Energy Research Journal; International Journal of Oil, Gas and Coal Technology; News Letter Editor, Secretary/Treasurer, Division Chair of the Energy Conversion and Conservation Division, American Society for Engineering Education; Conference Chair of 17th ASME International Conference on Fluidized Bed Combustion; Treasurer, Petroleum Chemistry Division of the American Chemical Society; Program Chair, Fuel Chemistry Division, American Chemical Society.

In recognition of his contributions, he received numerous awards. To name a few – RA Mashelkar Medal for Innovators and Science Leaders, IChE, Best Paper Award, Energies Journal 10th Anniversary, CHEMCON 2016 Best Paper Award under the Category "Energy." Best Paper Award, AIChE Annual meeting, in the Session on "Fluidization and Fluid-Particle Systems," four Best Paper Awards from Energy Conversion and Conservation Division of American Society of Engineering Education; CHEMCON Distinguished Speaker Award, George W. Atherton Award for Excellence in Undergraduate Education (University's highest award in teaching); e-Education Faculty Fellowship in recognition of contributions to e-education; Marion and Montgomery Mitchel Award for Innovative Teaching; Matthew J. and Anne C. Wilson Award for Excellence in Teaching; Innovative Incentive Award; Outstanding Technical Paper Award, Thirteenth Annual International Pittsburgh Coal Conference.



Biography : Dr Krishna V Mirji



Former General Manager
Special Materials Plant,
Nuclear Fuel Complex,

Contact:
Ph.no:98499495131



Nuclear Fuel Complex,
Department of Atomic Energy
Hyderabad, India

Shri K V Mirji, superannuated as General Manager from NFC during the middle of 2020. He commenced his career at Special Materials Plant of Nuclear Fuel Complex, Hyderabad in the development and production of high purity electronic and special materials. Shouldering higher responsibilities, he has been deeply involved with development and production of several strategic and critical materials for use in nuclear, defense, space and advanced engineering for the last three and half decades. He has got certificates of "Excellence Quality" from the users of the materials. He is recipient of many prestigious awards like DAE Special Contributions Award, DAE Group Awards (thrice), Work of Excellence Award "Chinnamaul Memorial Prize" from IChE etc. He has published more than 120 technical papers in reputed international/national journals and is reviewer for International journals. He is a brilliant scientist with a flair for development and made significant, commendable contributions in field of critical materials & vacuum technology etc. He is a faculty member in Indian Vacuum Society (IVS).

Some of his highly recent recognized works are: Development of a process for super conducting (SC) RRR grade Nb metal in prototyping of SC cavities for accelerators, Development and production of varieties of ultra-pure materials, Development of Nb-1Zr-0.1C alloy for thermal hydraulic loop for Compact High Temperature Reactor(CHTR) applications, Development of Nb-1W-2.5Zr(Cb752) alloy for defense applications, Development of Zr-Nb-B alloy for strategic nuclear reactor applications, Development of Al coated Zr powder as solid propellant in defense area, Development of thermal batteries covering lithium/Zr metal powder, Indigenous development of high power Electron Beam Melting Furnace for purification of refractory metals that was inaugurated by honorable President of India on 15th May 2018 etc. Many of these outstanding contributions are first time achievements in the country. Recently he was actively involved in the development of nano materials, nano Al as propellant, High Energy Materials, Micro Wave Absorbing Materials, and Thermal Batteries etc.

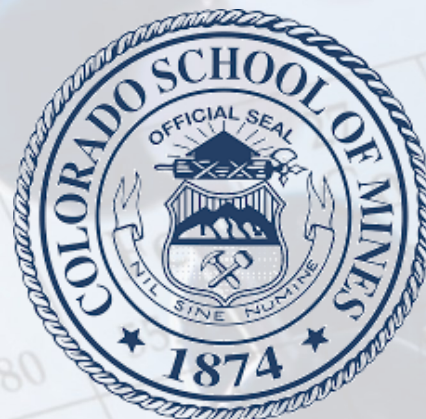


Biography : Dr. Corby G. Anderson



Professor Harrison Western
Director Kroll Institute for Extractive Metallurgy
Director Center for Resource Recovery & Recycling

Contact:
T: 303 273 3580 F: 303 273 3795 C: 406 491 4002



**Engineering Department &
George S. Ansell Department of Metallurgical and
Materials Engineering
Colorado School of Mines,
United States of America.**

Dr. Corby G. Anderson is a Licensed Professional Chemical Engineer with over 40 years of global experience in industrial operations, corporate level management, engineering, design, consulting, teaching, research, and professional service. He is a native of Butte, America. His career includes positions with Thiokol Chemical Corporation, Key Tronic Corporation, Sunshine Mining and Refining Company, H. A. Simons Ltd. and at CAMP-Montana Tech. He holds a BSc in Chemical Engineering from Montana State University and an MSc from Montana Tech in Metallurgical Engineering and PhD from the University of Idaho in Mining Engineering - Metallurgy. He is a Fellow of both the Institution of Chemical Engineers and of the Institute of Materials, Minerals and Mining. He has directed or co directed over 40 Graduate students. He shares 16 international patents and 3 new patent applications covering several innovative technologies, 6 of which were successfully reduced to industrial practice.

He currently Directs the Kroll Institute for Extractive Metallurgy serves as the Harrison Western as part of both the Mining Engineering Department and the George S. Ansell Department of Metallurgical and Materials Engineering at the Colorado School of Mines. He is also the CSM Director for the Center for Resource Recovery and Recycling. In 2009 he was honored by the Society for Mining Metallurgy and Exploration with the Milton E. Wadsworth Extractive Metallurgy Award for his contributions in hydrometallurgical research. In 2015 he was awarded the International Precious Metals Institute's Tanaka Distinguished Achievement Award. In 2016 he received the Distinguished Member Award from the Society for Mining, Metallurgy and Exploration, and became a Distinguished Member of the U of Idaho Academy of Engineering. In 2017 he received the EPD Distinguished Lecturer Award from The Minerals, Metals and Materials Society. In 2019 he was named as a Henry Krumb Distinguished SME Lecturer. In 2019 he was also appointed and serves now as a Visiting Faculty within the Minerals Engineering Department of Central South University in China, the largest program of Mineral Processing and Extractive Metallurgy in the world. In both 2016 and in 2021 he received an Outstanding Faculty Award from the Colorado School of Mines. He was also elected in 2021 to the Sigma Xi Scientific Research Honor Society. In 2022 he received the TMS EPD Distinguished Service Award for his career contributions. Finally, in 2022 he and his co authors received the SME Taggart Award for a notable contribution to the science of mineral processing.



Biography : Dr. Shivakumar Angadi



Principal Scientist
Mineral Processing Department.

Contact:

*Ph.no:08763866142, +91 674 2379273 Fax:+91
0674-2567650,
email: shivakumar@immt.res.in,
shivakumar_ism@yahoo.com*



**Mineral Processing Department
CSIR-Institute of Minerals and Materials
Technology
Bhubaneswar , Odisha,
India.**

Dr. Angadi completed his M.Tech in Mineral Processing from Karnataka University, Dharwad, in the year 2000. Subsequently, he joined IIT-ISM, Dhanbad, to pursue Ph.D. in Mineral Engineering, wherein he worked on flotation kinetics and entrainment in conventional and column flotation machines for his Ph.D. degree.

Later, he worked with the Mineral Processing SBU, Tega Industries Ltd., Kolkata, wherein he gained industrial experience of about two years and eight months. He was in-charge of the mineral processing laboratory and was responsible for the technical inputs to the commercial offers. He had responsibilities such as the selection of hydrocyclones, flowsheet development, plant commissioning, conducting plant-level test works, improvements of the laboratory facilities, etc. During his tenure, many successful plant commissioning/test works have been carried out.

Since 2007, Dr. Angadi has been working as a Scientist in the Mineral Processing Department, CSIR-Institute of Minerals and Materials Technology, Bhubaneswar. He is working on the development of processing flowsheets for the lean-grade ores along with the recovery of critical minerals such as tungsten, rare earth, and lithium from the Indian deposits. Dr. Angadi was a visiting scientist at the University of Utah, USA (Jan-Dec, 2014) and was working on the surface properties of ore minerals and their role in flotation. He was on a Postdoctoral fellowship for the period of one year at the Korea Institute of Geoscience and Mineral Resources (KIGAM), South Korea.

He has 33 peer-reviewed articles, 2 patents, and about 50 industry-sponsored projects to his credit. He has guided many Ph.D. and M.Tech students (1 student completed Ph.D., and another 3 students are pursuing).



Biography : Professor Lev Filippov



Professor,

*Ecole nationale supérieure de Géologie (ENSG)
Head of Minerals Engineering Team.*

Contact:

*Ph.no: +33 3 72 74 45 46 ; (m) +33 6 2758 7426
email: lev.filippov@univ-lorraine.fr*



**UNIVERSITÉ
DE LORRAINE**

**GeoRessources Laboratory, UMR 7359 CNRS-UL,
ENSG, 2 rue du Doyen Marcel Roubault, BP 10162
54505 VANDOEUVRE LES NANCY CEDEX,
France**

Lev Filippov is Full Professor at the National Engineering School of Geology and Head of the "Minerals engineering" team at GeoRessources Laboratory of the University of Lorraine (Nancy, France). With over 40 years of experience in mineral processing research topics (mainly in the flotation) he authored more than 250 peers reviewed and conference papers and 25 patent applications. The main research areas cover the fundamental and applied researches on the flotation recovery of the strategic metals from primary (ores) and secondary resources.

The significant contributions were achieved in the surface chemistry and modelling of the synergistic effects in mixed collector systems, especially with non-ionic reagents and in the development of reverse cationic flotation of iron and phosphate ores with complex gangues mineralogy. Currently he is developing the combined approaches to process the Li and rare metals from the pegmatite ores and from unconventional rare metals granites.

He was involved as executive board member and task leader in major H2020 European large scale research project such as STOICISM, BioMore, FAME, Fine Future and recently in a Horizon Europe's project devoted to the extraction routes for recovering distinct critical metals and industrial minerals as by products from key European hard rock lithium projects.



Biography : Dr Saeed Farrokhpay



Associate Professor
Chemical Engineering Department.

Contact:

*Email: saeed.farrokhpay@aum.edu.kw
www.aum.edu.kw*



**American University of the Middle East,
Kuwait**

Dr Saeed Farrokhpay is a Chemical Engineer with several years of experience in mineral & material processing. He obtained his PhD from the University of South Australia in 2005. He has published more than 90 papers in high-ranked journals and conference proceedings.

He has also edited several technical and scientific books and served as an editorial board member of several international scientific journals. His main interests are flotation and physical separation, application of rheology in optimizing mineral and material processing, and processing complex ores.



Biography : Dr. Sushanta Kumar Sahu



Senior Principal Scientist & Professor (AcSIR)

Metal Extraction & Recycling Division

Contact:

Phone: +91-657-234-6029 ; (M)+91-943-152-1200

<http://www.nmlindia.org>



**CSIR-National Metallurgical Laboratory
Jamshedpur - 831007, INDIA**

Dr. Sushanta K. Sahu is currently working as Senior Principal Scientist at Metal Extraction & Recycling Division of CSIR-National Metallurgical Laboratory, Jamshedpur, India. He has noteworthy experience in the field of non-ferrous extractive metallurgy and recycling of metal values from wastes and secondaries by hydrometallurgical route. He is an honorary professor at Academy of Scientific and Innovative Research (AcSIR). Two students have been awarded PhD degree and one student has been awarded M.Tech degree under his supervision. Currently two students are doing PhD under his guidance.

He has more than 40 publications in SCI journals, 5 patents and 45 publications in National and International Conference proceedings in various fields of hydrometallurgy. He is the recipient of Tarun Datta Memorial Young Scientist Award presented by Indian Association of Nuclear Chemists & Allied Scientists (IANCAS). He visited Dept. of Materials Engineering, University of British Columbia, Vancouver, Canada as Visiting Professor under BOYSCAST Fellowship programme. He also visited University of Lorraine, France as visiting scientist



Biography : Dr. Rick Q. Honaker



Professor Chair

*University of Kentucky,
College of Engineering*

Contact:

*Phone: 859-257-1108, Fax: 859-323-1962,
Email: rick.honaker@uky.edu*



**University of Kentucky,
College of Engineering,
Mining Engineering Department
Lexington, KY,
United States of America**

Dr. Honaker is a Professor of Mining Engineering and a designated University Professor with distinction at the University of Kentucky (UK). He received B.S. (1986), M.S. (1988) and Ph.D. (1992) degrees in Mining & Minerals Engineering from Virginia Tech. Dr. Honaker guides a research program in extractive metallurgy that has been awarded nearly \$30 million in research funding resulting in 250 publications as author or co-author including 140 peer-reviewed articles, seven U.S. patents and patent applications, and over 50 substantive project reports. Over the last four years, Dr. Honaker has worked with federal and state governments, university partners and industrial companies in an effort to design, construct and test a pilot-plant for rare earth and critical material recovery and extraction.

Dr. Honaker recently served on the Board of Directors for the Society for Mining, Metallurgy and Exploration and is currently serving as an Engineering Accreditation Commissioner for ABET as well as an Executive Board member for the Coal Preparation Society of America. He has received numerous awards recognizing his contributions including the Frank F. Aplan Award in 2007 from the American Institute of Mining Engineers and the prestigious Robert H. Richards Award in 2015 from the Society for Mining, Metallurgy and Exploration.

