



CV of Prof. Vasant Kumar

1. PERSONAL DETAILS

Name: Professor R Vasant Kumar, FIMMM, FEI, FIAAM, FRSC

Present Appointment: Professor and Head of Materials Chemistry ; Distinguished Research Fellow

Department/ Faculty: Materials Science & Metallurgy/ Physics & Chemistry at University of Cambridge

Qualifications: PhD in Materials Engineering (McMaster University, Canada)

B.Tech (Hons) in Metallurgical Engineering (IIT Bombay)

2. OTHER APPOINTMENTS & AFFILIATIONS

Editor-in-Chief of "Mineral Processing and Extractive Metallurgy" for the Institute of Materials, Minerals & Mining, since 2004; **Editorial Board Member** of (i) "Advances in Nanoparticles" of Scientific Research Publishing from 2012; (ii) "Materials Today Chemistry" of Elsevier Ltd from 2017; (iii) Materials Circular Economy, Singapore from Oct 2018 .

Board Member of the Institute of Materials, Minerals & Mining (IOM3)'s technical division Mineral Processing & Extractive Metallurgy since April 2012; **Advisory Board Member** of TECHMET Ltd, London (from 2019) and Korea National Lithium Research Center (from 2020)

Reviewer for over 20 International journals and publishers including, Nature Journals & RSC Journals and for funding bodies such as EPSRC, British Council, Horizon 2020, Research councils in Italy, Denmark, Belgium, France, Switzerland, and Kazakhstan, Georgia; EPSRC **Panel Member**; **Member** of Hydrogen and Fuel Cell SUPERGEN Science Board; and CO₂ Mineralization Cluster

Founder and Director of

- (i) Green PB Ltd in 2008, in order to advance an eco-friendly process for recycling batteries developed in our group, evaluation license in 2013-15 to Johnson Control Solutions, and AEL, UK from 2016-2020, and global license to iQ International 2020 and UK pilot plant by Ever Resource Ltd;
- (ii) Solutions for Hydrogen Sensing Ltd., (S4H) in India, making instruments for safety, process control and environmental monitoring from 2008- Absorbed by MNST Ltd;
- (iii) CAMSES Ltd, a start-up company in Cambridge, nano-materials based composite photocatalysts for water disinfection, air pollution mitigation and hydrogen synthesis, 2012, led to social enterprise Majico for application trials in Africa and S. Asia;

- (iv) Multi Nano Sense Technology Pvt. Ltd (MNST), for technology development of semiconductor CMOS-MEMS chip based platform sensors technology for gaseous and dust (PM2.5) monitoring from 2020;
- (v) Environmental Monitoring & Control Ltd., a start-up company in Stafford, UK, producing solid state sensors and sensing instruments from 2004

3. Organizing/ Advisory Committee of International Conferences:

- Batteries India International Summit & Workshop, 2018 (Goa), 2019 (Goa) and 2020 (Bengaluru), 2022 (Bengaluru) also scheduled in Bengaluru in 2023
- Geo-metallurgy in IOM3 London in July 2022
- NISCO Centre of the University of Leicester, "Decarbonisation and Net-Zero Target 2050 for manufacturing industry" on 9 February 2022
- Nankai- Cambridge workshop on Advanced Materials, 19-22 May, 2019
- Sustainable Industrial Process Summit, SIPS 2014, in Cancun, 2016 in Hainan, 2015 in Antalya, 2017 in Cancun, 2018 in Rio de Janeiro, 2019 in Cyprus, 2022, Phuket, Thailand
- Cambridge China Alumni workshop on Advanced Materials, September 2018, Beijing
- Hydrogen and Fuel Cells Symposium in Int. Materials. Research Congress Cancun, 2017
- Frontiers in Materials Science (FiMPART 2) in Bordeaux, July 2017
- Mining and Metallurgy, Cape Town, South Africa June 2017
- 5th International Slag Valorisation Symposium in Leuven, Belgium April 2017, 2018, 2019, 2021
- International Materials and Metallurgical Conference 2016, in Istanbul, Turkey Sept 2016
- Schetman (Nobel Laureate) Symposium on Sustainable Materials, in Cancun, July 2014, Antalya, Oct 2015, Hainan 2016 and Cancun 2017, Rio de Janeiro 2018, Cyprus 2019, Phuket 2022; Organizing Chair of the 1st, 2nd, 3rd, 4th, 5th, 6th and 7th respectively on "Sustainable Batteries" sessions
- From "Mine to Market" Organizer of the IOM3 international conference in Trinity Hall, Dec 11-12, 2015
- Fray Symposium on Metals and Materials Processing in Cancun, Nov-Dec 2011
- Int. Conf. on Sustainable Materials in Penang, Malaysia, 9-11 June 2007
- China Distinguished Materials Scientist Forum II in Cambridge in June 2007; China Distinguished Materials Scientist Forum I, held in University of Science & Technology in Beijing in September 2006
- Int. conf. on Metallurgical Developments, Perlis, Malaysia, 9-11 Dec 2006
- European Workshop held in Cambridge, on "Tomorrow's Technology in Minerals and Metals", April 2005

- International Rare Earth Conference in Nara, Japan, November 2004

4. External PhD Examiner in several universities including St. Andrews, Birmingham, Cranfield, Imperial College, QMUL, UCL, Leeds, Manchester, Nottingham, Antwerp, IISc Bengaluru, RTM Nagpur, IISc Bengaluru, IIT – Jaipur, Dhanbad, Mandi, BHU; **External UG Examiner** in University of Malaysia 2005-08; **Research Advisor** University of Malaysia; 2008-11.

5. Publications/Plenary / Keynote / Invited Lectures: Over **360+ papers, 20+ chapters in handbooks and 2 edited books** on Batteries (VCH-Verlag)

Plenary lecturer in over 35 international conferences/seminars and **keynote/invited lecturer in over 50** conferences/seminars. Recent Examples:

1. Invited talk on 6 Oct in Istanbul, Turkey in the 21st International Metallurgy and Materials Congress (IMMC 2022) with the theme of "Global Warming and Climate Crisis". His talk is entitled "The enabling role of materials chemistry towards net-zero carbon".
2. Invited talk on "Batteries" in McMaster University, Hamilton, Canada on 1 September 2022.
3. Keynote talk in European Advanced Materials Congress on 25th June, 2022 in Genoa, Italy on "Beyond Li-ion Batteries".
4. Three talks in Battery India 2022 in June 2022 in Bengaluru, covering various topics in batteries including a Tutorial Workshop on Fundamentals of Battery Chemistries.
5. Plenary Lecture in International University Metallurgical Council in May 2022 in Beijing on "Zero – Carbon metal production".
6. Invited talk on "Energy Storage in Batteries for Sustainable Electrification" at the bp-ICAM Webinar Series on 28th April 2022.
7. Keynote talk on "Zero-carbon Steelmaking" at NISCO Centre of the University of Leicester in Jan 2022 in webinar series on "Decarbonisation and Net-Zero Target 2050 for manufacturing industry".
8. Keynote talk in MRSI-AGM conclave on 21st Dec, 2021 in Bengaluru, India on "Inorganic Polymer Composites in Solid State Batteries".
9. Invited talk on "Energy System Paradigm in India in a Global Context" at the Indian Institute of Materials Management on 9 Dec 2021, Mumbai, India.
10. Invited talk on "Energy Storage for Sustainable Electrification" at the IEEE conference on 29 Oct 2021, Bengaluru, India.

6. AWARDS & HONOURS

Fellowship of the Royal Society of Chemistry, October 2022

Fellowship of the Institute of the Institution of Association of Advanced Materials (Sweden) in June 2022

Fellowship of the Institute of Energy (FEI) in May 2019

Adjunct Professor, BHU – IIT, Banaras, India 2021

Guest Professor awarded, by Nankai University 2019 and Xinyang Technical College in June 2016

Appointed as “Specialist consultant of the Xiangyang Association of the Automobile Manufacturers, China in Dec 2015

Fellowship of the Institute of Materials, Minerals and Mining, (FIMMM) in Jan 2015

Kroll Medal and Prize 2014, awarded by **Institute of Materials, Minerals & Metals, IOM3**, in recognition of significant contribution that has enhanced the scientific understanding of materials chemistry as applied to the industrial production of materials

DOW Sustainability Innovation Award Grand Prize on “High energy density Li-S batteries”, June 2013

DOW Sustainability Innovation Students Runners-Up on “Photocatalytic Materials”, June 2012

Honorary Doctorate of Engineering at University of Malaysia, Perlis, 17 September 2011

Guest Professorship at Huazhong University of Science & Technology, Wuhan, China awarded, 29 March 2011

Armourers & Brasiers Venture Prize for the invention of a new technology for recycling automotive batteries in an environmentally friendly process, June 2007

Honorary Professorship at Hebei University, Tansheng, China awarded, 14 September 2006

Innovative Metrology Award DTI/NPL, “Emission measurement of exhaust gases” - Nov 2000

Fellow in Natural Sciences of Trinity Hall since 1 January 1999.

Links to Relevant Sites:

1. Advisory Board Member of TechMet, a private industrial company that is building controlling or significant minority positions in world-class projects across the energy technology metal supply chain. <https://www.techmetlimited.com>
2. Founder & Director of Multi Nano Sense Technology Ltd., a start-up company, manufacturing and marketing solid state electrochemical sensors and developing platform sensors based on miniaturized, low-power and wireless semiconductor chip for numerous applications including air quality monitoring, personal health monitoring and industrial safety, process and environmental applications: www.multinanosense.com
3. Editorial Board Member of “Materials Today Chemistry” <https://www.sciencedirect.com/journal/materials-today-chemistry/>
4. A new process developed in the group has been licensed to iQ International and Ever Resource Ltd, and piloted by UK collaborator Ever Resources Ltd. In Jan 2019, the project received Rushlight Awards, organized by IUK, Department of Business, Energy & Sustainability along with UKRI for innovations in two categories held in Royal Society, London.
(<https://warehousenews.co.uk/digital/mar119/> and <https://warehousenews.co.uk/2019/02/aurelius-celebrates-success-at-the-rushlight-awards/>)

5. Founder & Director of start-up company producing high temperature gas sensors for environmental monitoring, process control and energy reduction: <https://www.emclimited.co.uk>
6. Founder & Director of start-up company producing instruments for safety monitoring, hydrogen measurement & control and leak detection, technology transferred to Multi nano Sense Technologies pvt. Ltd.: <https://www.solutions4hydrogen.com>
7. Editor of the Institute of Materials, Minerals & Mining (IOM3) journal Trans. IMM: Section C, incorporating Proc. AusIMM: <https://mpm.edmgr.com>
8. Staff Fellow, Director of Studies, Tutor of Trinity Hall, Cambridge: <https://www.trinhall.cam.ac.uk>
9. Board Member of the IOM3's technical division Mineral Processing & Extractive Metallurgy: <https://www.iom3.org/content/mineral-processing-extractive-metallurgy-division>
10. Editorial Board Member of "Advances in Nanoparticles" of Scientific Research Publishing from 2012: <https://www.scrip.org>
11. Founder & Director of CAMSES Ltd a spin out company for synthesising materials and fabricating devices for photocatalytic applications and work continued in Majico – a social enterprise for water disinfection with partners in Tanzania: <https://www.camses.co.uk>
12. DoITPoMS - Dissemination of IT for the Promotion of Materials Science (DoITPoMS); Teaching & Learning Packages, Supervised construction of a number of packages: Batteries, Recycling, Thermal Analysis, Ellingham Diagrams: <https://www.msm.cam.ac.uk/doitpoms>

<https://uk.linkedin.com/pub/r-vasant-kumar/5/b08/bb0>

Current Project Areas:

- Batteries: Li-S, Li-ion, Na-ion, K-ion, Lead Acid, High temperature batteries – synthesis of advanced materials, fabrication of components and devices, characterization methods
- Environmental: Circular Economy, Recovery, Upgrading, Recycling, carbon capture
- Fuel Cells: Solid Oxide Fuel cells, Photocatalytic reactions
- Sensors: Electrochemical, Optical, Semiconducting CMOS-MEMS, Thermal
- Metallurgy: Iron & Steel, Base Metals, Molten Salt processes, Electrochemical

Project Sponsors, Collaborators:

- Grants: EPSRC, RCUK, H2020, Innovate UK, British Council
- Industry: WPIC, S Korea; Ever Resource Ltd, iQ International (US-Swiss), Metrol Ltd, Plasma-App Ltd, Meta plc, Johnson Matthey plc, Knauf, Carmeuse (Belgium), Sigma Lithium Ltd, TATA Group, Environmental Monitoring & Control Ltd, Multi-Nano Sensing Technology (India), TechMet Ltd, Enzyme Energy (The Netherlands), Keronite, Talga, NFTDC(India), Reliance Batteries, Ola Electric

- Research Institutes / Universities: Open University, QMUL, Imperial College, St Andrews University, IIT-Bombay, IIT-Bhilai, Thapar Institute, BHU-IT, IIT-Mandi, VNIT-Nagpur, RTM Nagpur University, University of Florida, Beijing Institute of Technology, University of Science & Technology Beijing, HUST Wuhan, Nankai University, North Eastern University Shenyang, IIT-Delhi, IISc-Bengaluru, Non Ferrous Technology Development Centre Hyderabad, University of Ghana, University of Tanzania, Delft University, Sofia University, Inst. Of S Punjab Multan, UEAS Swat, ARMINES –Paris, NUS Singapore, IEES Sofia, CNR Italy, UCM Skopje

Research Supervision

His research has helped advance new knowledge in materials chemistry with innovations in sensors, batteries, fuel cells, electrolytic cells and photocatalysis. He has supervised over 45+ PhD students, 45+ post-doctoral researchers, 20+ visiting students and hosted 15+ visiting professors.

Teaching Experience

University teaching at undergraduate and graduate levels of over 3 decades covering a wide variety of subjects relating to Materials Chemistry, Electrochemistry, Metal refining & recycling; Heat & Mass transfer; Chemical Thermodynamics and Mineral & Metallurgical Chemistry.

Lectures, Examples Classes, Tutorials, Laboratory Classes, Supervisions, undergraduate research projects, industrial visits, seminars, online courses-self learning packages, examinations, admission interviews and other related activities.