

International Webinar on

Industrial Catalysis

Organized by

Catalysis Society of India, Mumbai Local Chapter

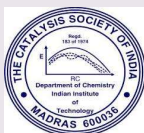
in association with

ICT – Mumbai & ACS India International Chapter

Book of Abstracts

On 3rd October 2020, 9:00 AM to 5:00 PM (IST)

Please visit <http://www.catalysisindia.org> for more details.



International Webinar on Industrial Catalysis

Organized by
Catalysis Society of India, Mumbai Local Chapter
in association with
ICT – Mumbai & ACS India International Chapter

On 3rd October 2020, 9:00 AM to 5:00 PM (IST)
At Virtual Platform

Speakers



Prof. Mannepalli Lakshmi Kantam

- Dr. B. P. Godrej Distinguished Professor, Institute of Chemical Technology, Mumbai, India
- Topic: Development of Catalysts for the Conversion of Biomass Derived Compounds into Value Added Compounds



Prof. Ganapati D. Yadav

- Emeritus Professor Eminence & Former Vice Chancellor, ICT, Mumbai, India
- Topic: Climate Change, Catalysis & Carbon Negative Economy



Dr. Raksh Vir Jasra

- Sr. Vice President (R&D), Reliance Industries Ltd. & President, Catalysis Society of India
- Topic: Role of Catalysis for the Sustenance of Chemical Industry



Prof. Takehiko Sasaki

- University of Tokyo, Japan
- Topic: Immobilized Ionic Liquid for Application of Heterogeneous Catalysis



Prof. Vikramaditya G. Yadav

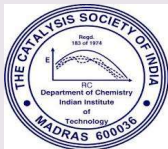
- Chemical, Biological & Biomedical Engineering, The University of British Columbia, Canada
- Topic: Making & Breaking Things Using Synthetic Biology



Prof. Masayuki Shirai

- Department of Chemistry and Biological Sciences, Iwate University, Japan
- Topic: Structure & Catalysis of Two-dimensional Metal Nano Particles Intercalated between Graphite Layers

Please visit <http://www.catalysisindia.org> for more details.



International Webinar on Industrial Catalysis

Organizing Committee

Catalysis Society of India, Mumbai Chapter

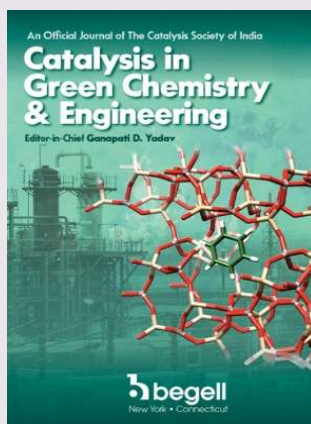
Chairman: Prof. B. M. Bhanage

Secretary: Prof. V. K. Rathod

Treasurer: Prof. R. V. Jayaram

Dr. Sharad Lande, AVP (R&D) RIL-Mumbai

Vision of Catalysis Society of India



CSI Journal

- ❖ Growth of catalysis research activity in India.
- ❖ Facilitating collaboration between industry-government-academia and building bridges between generations of catalysis scientists.
- ❖ Special initiatives for nurturing young researchers across the country & encouraging woman scientists.
- ❖ Please visit <http://www.catalysisindia.org> for CSI membership & more details.

Program schedule and live event link will be communicated later.

E-Certificates will be provided for registered participants.

For further details, please contact: Dr. Sharad Lande

(sharad.lande@gmail.com) & Prof. V. K. Rathod

(vk.rathod@ictmumbai.edu.in) or icatwebinar@gmail.com

For Free Registration, Use link or QR Code

<https://forms.gle/i8a5d8MmPgXnDNDu7>



Programme Schedule

One Day International Webinar on “Industrial Catalysis” - 3rd Oct 2020

(Organized by Catalysis Society of India, Mumbai Local Chapter in association with ICT Mumbai & ACS India International Chapter)

Time (IST)	Activity
9.00-9.15 AM	Online Joining MS Team Live Event
9:15- 10:00 AM	<ul style="list-style-type: none">▪ Inauguration, Prof. A.B. Pandit, Vice-Chancellor, ICT, Mumbai▪ Dr. R.V. Jasra, President, Catalysis Society of India▪ Prof. G.D. Yadav, President, ACS India International Chapter▪ Prof. B.M. Bhanage, Chairman, CSI, Mumbai Chapter
10:00-10:45 AM	Prof. M. Shirai : Structure & Catalysis of Two-dimensional Metal Nano Particles Intercalated between Graphite Layers
10:45- 11:00 AM	Q & A
11:00- 11:45 AM	Prof. T. Sasaki: Immobilized Ionic Liquid for Application of Heterogeneous Catalysis
11:45- 12:00 PM	Q & A
12:00- 12:45 PM	Prof. G. D. Yadav: Climate Change, Catalysis & Carbon Negative Economy
12:45- 1:00 PM	Q & A
Break (1:00- 2:00 PM)	
2:00- 2:45 PM	Dr.R.V. Jasra: Role of Catalysis for the Sustenance of Chemical Industry
2:45-3:00PM	Q & A
3:00-3:45 PM	Prof. Lakshmi Kantam : Development of Catalysts for the Conversion of Biomass Derived Compounds into Value Added Compounds
3:45-4:00PM	Q & A
4:00-4:45 PM	Prof. V. G. Yadav: Making & Breaking Things Using Synthetic Biology
4:45-5:00PM	Q & A
5:00-5:15 PM	Vote of Thanks

Structure and Catalysis of Two-dimensional Metal Nano Particles Intercalated between Graphite Layers



Prof. Masayuki Shirai
Faculty of Science and Engineering, Ueda,
Morioka, Iwate 020-8551 (Japan)
*mshirai@iwate-u.ac.jp

Abstract

Several metal chlorides can be incorporated between graphite layers to produce graphite intercalated compounds (MCl_x-GIC). It is expected that two-dimensional metal particles could be formed by the reduction of the metal chlorides between graphite layers because of the steric hindrance of the layers against the growth of metal particles. In this paper, we report the preparation of metal (platinum and iridium) nano particles with two-dimensional structure (Pt nanosheets and Ir nanodisks) by the reduction of platinum or iridium chloride between graphite layers and their selective hydrogenation performance.

A mixture of solid metal chloride (PtCl₄ or IrCl₄) and powder graphite (KS6, TIMREX), which was treated under 0.3-0.5 MPa of chlorine at 723 K for 7 days, was reduced at 573-773 K for 1 h under 40 kPa of hydrogen to produce metal intercalated between graphite (M-GIC (M= Pt or Ir)). Platinum or iridium metal particles located on graphite layers (M/Gmix) were prepared by an impregnation method, separately. Cinnamaldehyde (UAL) hydrogenation behaviors was studied in 10 MPa of supercritical carbon dioxide solvent (scCO₂) under 5 MPa of hydrogen at 323 K.

TEM images of 5Pt-GIC (5 wt% platinum loading) showed that platinum nanosheets between 0.8 and 3 nm thickness and 300 nm * 200 nm extent were arranged in parallel with graphite layers and many hexagonal holes were also observed at the edge of the platinum sheets [1]. The sides of

hexagonal holes were straight and the angles between two straight sides were oriented at 120°. UAL hydrogenation activities of Pt-GIC were studied over Pt-GIC. Cinnamyl alcohol (UOL), hydrocinnamaldehyde, and hydrocinnamyl alcohol were formed and the UOL selectivity was almost constant at 77% and dehydroxylation products were not formed over Pt-GIC [1]. Pt/Gmix was also active for the hydrogenation; however, the UOL selectivity over Pt/Gmix was less than 50% and the dehydroxylation by-products were formed.

TEM images of the side view of 5Ir-GIC showed no iridium metal particles could be located on the graphite surface and iridium metal particles with 2 nm thickness and 9-10 nm width are intercalate between the two graphite layers indicating that the iridium metal particles with disk-shape were intercalated between graphite layers. [2]. Ir-GIC showed the high UOL selectivity more than 94%. On the other hand, the UOL selectivity was less than 70% over Ir/Gmix.

References

- [1] Shirai, M., The Chemical Record, 19, 1263 (2019).
- [2] Kato, S., Nanao, H., and Shirai, M., Chemistry Letters, 48, 1262 (2019).

Masayuki SHIRAI

Professor,
Department of Chemistry and Biological Sciences,
Faculty of Science and Engineering, Iwate University
4-3-5 Ueda, Morioka, IWATE 020-8551
Fax +81-19-621-6336
email mshirai@iwate-u.ac.jp



Education

1988 B. Sc., Science University of Tokyo (Supervisor Prof. Kenzi Tamaru)
1990 Ms. Sc., The University of Tokyo (Supervisor Prof. Yasuhiro Iwasawa)
1993 Ph. D., The University of Tokyo (Supervisor Prof. Yasuhiro Iwasawa)

Professional Career

1993 Research Associate, Tohoku University
2002 Associate Professor, Tohoku University
2002 Team Leader, AIST
2013- Professor, Iwate University
2002-2008 Editorial board of *Journal of the Japan Petroleum Institute*
2010- Editorial board of *Applied Catalysis A*
2015- Editorial board of *Zairyou Hyomenn (Japanese)*
2018- Editorial board of *Clay Science*

Awards

1997 Young Scientist Award, Tokin Foundation
1997 Young Scientist Award, Harada Foundation
2001 Young Scientist Award of the Clay Society of Japan

Immobilized Ionic Liquid for the application of Heterogeneous Catalysts



Takehiko Sasaki

*Department of Complexity Science and
Engineering, Graduate School of Frontier
Sciences, The University of Tokyo, 5-1-5
Kashiwanoha Kashiwa, Chiba 277-8561, Japan
Email: takehiko@k.u-tokyo.ac.jp*

Ionic liquids have received much attention because of their versatile properties such as electrolytes in electrochemistry, environmentally friendly solvents in organic synthesis, and immobilizing phases for biphasic catalysis. They are also regarded as precursor materials for catalysts. Ionic liquids have received much attention as immobilizing phases in biphasic catalytic reactions. The immobilization of ionic liquids on solid supports can circumvent the cost problem of ionic liquids and satisfy the requirements from chemical industry as to the ease of separation, recovery of catalyst from reaction mixture and the possibility to use a fixed bed reactor. In this context the concept the Supported Ionic Liquid Phase (SILP) Catalysis has been proposed with much attention. Another method is to immobilize ionic liquids on solid supports by covalent bonding between silyl groups on the ionic liquid cations and silanol groups on support surfaces. We have prepared the immobilized ionic liquid catalysts on silica support using 1-methyl-3-trimethoxysilyl propyl-imidazolium chloride [1]. Various transition metal chlorate catalysts can be prepared by this method and well characterized [2]. Immobilized metal-ion containing ionic liquid catalysts thus prepared have been successfully applied to Suzuki cross-coupling reaction [3], carbonylation reaction [4] and transfer-hydrogenation reaction [5]. This method could be applied to graphene oxide as support [6].

Immobilized metal-ion containing ionic liquid catalysts can also be regarded as precursor for metal nanoparticle catalysts when metal chlorate anions are reduced by reductant such as NaBH_4 . Our recent results of the preparation methods for size-controlled syntheses and the immobilization of

metal nanoparticles on solid supports will be introduced [7].

- [1] T. Sasaki, C. Zhong, M. Tada, and Y. Iwasawa, *Chem. Commun.* 2506-2508 (2005).
- [2] Sasaki, T.; Tada, M.; Zhong, C.; Kume, T.; Iwasawa, Y., *J. Mol. Catal. A Chem.* **2008**, 279, 200-209.
- [3] Zhong, C.; Sasaki, T.; Tada, M.; Iwasawa, Y., *J. Catal.* **2006**, 242, 357-364.
- [4] M.V. Khedkar, T. Sasaki and B.M. Bhanage, *ACS Catal.* (2013) **3**, 287-293.
- [5] Patil, N. M.; Sasaki, T.; Bhanage, B. M., *Catal Lett* **2014**, 144, 1803-1809.
- [6] V.K. Gaikwad, V.B. Saptal, K. Harada, T.Sasaki, D. Nishio-Hamane, and B.M. Bhanage, *ChemNanoMat*, **4**, 575-582 (2018).
- [7] Kusumawati, E. N.; Sasaki, T., *Chem. Rec.* **2019**, 19, 2058-2068.

Takehiko Sasaki



Takehiko Sasaki is Associate Professor, Department of Complexity Science and Engineering, School of Frontier Sciences, the University of Tokyo. He graduated from the University of Tokyo and got PhD degree at the Department of Chemistry in 1992. His research interests are Surface Physical Chemistry on solid surfaces, Catalytic Chemistry using ionic liquid derived materials and nanomaterials, and catalyst design and reaction mechanism study based on computational methods such as Density Functional Theory. He has published 135 refereed journal papers with h-index of 36.

Climate Change, Catalysis and Carbon Negative Economy



Ganapati D. Yadav
Emeritus Professor of Eminence
J.C. Bose National Fellow (GOI)
Former Vice Chancellor and R.T. Mody
Distinguished Professor &
Tata Chemicals Darbari Seth Distinguished
Professor of Leadership & Innovation
INSTITUTE OF CHEMICAL TECHNOLOGY,
MUMBAI

Energy and the environment are hot topics in the realm of climate change. The Paris Agreement 2015 has set ambitious goal for restricting the temperature rise to within 1.5-2 °C during this century. The over-use of oil products has done a great damage to the environment. The crude oil-based economy for the manufacture of fuels, chemicals and materials will not have a sustainable future and also to mitigate the CO₂ emissions need innovative approach and policies. Faced with the twin challenges of sustaining socioeconomic development and shrinking the environmental footprint of chemicals and fuels manufacturing, a major emphasis is on either converting biomass into low-value, high-volume biofuels or refining it into a wide spectrum of products. Using carbon for fuel is a flawed approach and unlikely to achieve any nation's socioeconomic or environmental targets. Biomass is chemically and geographically incompatible with the existing refining and pipeline infrastructure, and biorefining and biofuels production in their current forms will not achieve economies of scale in most nations. Synergistic use of crude oil, biomass, and shale gas to produce fuels, value-added chemicals, and commodity chemicals, respectively can continue for some time. However, carbon should not be used as a source of fuel or energy but be valorized to other products. In controlling CO₂ emissions, hydrogen will play a critical role. Hydrogen is best suited for converting waste biomass and carbon dioxide emanated from different sources, whether fossil or biomass into fuels and chemicals as well as it will also lead, on its own as energy source, to the carbon negative scenario in conjunction with other renewable non-carbon sources. This new paradigm for production of fuels and chemicals not only offers the greatest monetization potential for biomass and shale gas, but it could also scale down output and improve the atom and energy economies of oil refineries.

Professor Ganapati D. YADAV

B. Chem. Eng. Ph.D. (Tech.), D.Sc. (Hon. Causa, DYPU), D. Eng. (Hon. Causa, NIT-A) FTWAS,
FNA, FASc, FNASc, FNAE, FRSC (UK), FIE (India), FISTE, FICHEM (UK), FIChE, FICS

EMERITUS PROFESSOR OF EMINENCE

J.C. Bose National Fellow (Govt. of India)

Former Vice Chancellor and R.T. Mody Distinguished Professor and
Tata Chemicals Darbari Seth Distinguished Professor of Innovation and Leadership

INSTITUTE OF CHEMICAL TECHNOLOGY MUMBAI

Padmashri Awardee

Conjoint Professor, University of New Castle, Australia

Adjunct Professor, University of Saskatchewan, Saskatoon, Canada

Adjunct Professor, RMIT University, Melbourne, Australia

Founding Chair, ACS India International Chapter

President, Maharashtra Academy of Sciences

Former President, Catalysis Society of India

Former President, Indian Institute of Chemical Engineers

Council Member, Indian National Science Academy (2019-)



Professor G.D. Yadav is one of the topmost, highly prolific and accomplished engineering-scientists in India. He is internationally recognized by many prestigious and rare awards as an academician, researcher and innovator, including his seminal contributions to education, research and innovation in Green Chemistry and Engineering, Catalysis, Chemical Engineering, Energy Engineering, Biotechnology, Nanotechnology, and Development of Clean and Green Technologies. For 10.5 years, he served as the Founding Vice Chancellor and R.T. Mody Distinguished Professor, and Tata Chemicals Darbari Seth Distinguished Professor of Leadership and Innovation at the Institute of Chemical Technology (ICT), Mumbai, which is a Deemed-to-be-University having Elite Status and Centre of Excellence given by State Assembly on par with IITs/IISc/IISERs. He currently holds the titles of Emeritus Professor of Eminence and J.C. Bose National Fellow in ICT. He serves as the Adjunct Professor at University of Saskatchewan, Canada, RMIT University, Melbourne, Australia and Conjoint Professor, University of New Castle, Australia. He was conferred Padma Shri, the fourth highest civilian honour, by the President of India in 2016 for his outstanding contributions to Science and Engineering. He has been recipient of two honorary doctorates: D. Sc. (Hon. Causa, DYPU) and D. Eng. (Hon. Causa, NIT Agartala). As the Vice Chancellor he created many records.

Under his dynamic leadership, ICT made phenomenal progress having been declared as Category I institute, having started 23 new academic programmes, 5 new Departments and several Centres of Excellence, and establishment of two off-campus in Bhubaneswar with total support of IOCL and Marathwada with total support of Govt. of Maharashtra, and collected phenomenal funds. The ICT is listed in top 100 institutes in the Developing World by Times Higher Education Ranking in 2019. The Atal Innovation Ranking of MHRD has placed ICT as number 1 among Govt. funded Universities. He has personally won over 125 national and international honours, awards, fellowships, editorships, and several Life Time Achievement Awards by prestigious industrial organizations. He is an elected Fellow of Indian

National Science Academy, Indian Academy of Sciences, National Academy of Sciences, India, Indian National Academy of Engineering as well as The World Academy of Sciences, Trieste (TWAS). He is a Fellow of Royal Society of Chemistry, UK, Institution of Chemical Engineers, UK, Indian Institute of Chemical Engineers, Indian Chemical Society, and Indian Society for Technical Education, among others.

His research productivity is phenomenal with supervision of 100 Doctoral and 115 Masters Theses; which is the first record in ICT and for any Engineering Professor in India. Besides he has supervised 37 post-doctoral fellows, several summer fellows and research staff. He has published 453 original research papers, 115 national and PCT patents (74 granted); 3 books; h-index of 58, i10 index of 265; 12,600+ citations in journals, patents, books and monographs. He is still actively involved in guiding doctoral students, patenting, publishing, consulting and transferring technologies to industry.

The American Chemical Society (ACS) published a Festschrift (special issue) of Industrial and Engineering Chemistry Research (2014) in his honour with 65 original research papers from scientists from all over the world. He is the Founder President ACS India International Chapter. He is on editorial boards of prestigious journals like: ACS Sustainable Chemistry & Engineering, Green Chemistry, Applied Catalysis A: Gen, Journal of Molecular Catalysis A: Chem., Catalysis Communications, International Journal of Chemical Reactor Engineering, Clean Technologies and Environmental Policy, Current Catalysis, etc. He is the Founding Editor-in-Chief of Catalysis in Green Chemistry & Engineering (2017, Begell House, USA).

He has been a member or chaired several national and international committees of MHRD, DST, DBT, UGC, AICTE, CSIR, the PSA's on Green Chemistry, the Planning Commission's Pan India S&T Committee, and the Government of Maharashtra's Rajiv Gandhi S&T Commission Peers Group. He was Chairman, Research Council, CSIR-CSMCRI, member of RC of IICT Hyderabad and NIIST Trivandrum. He has served as a Chairman/member of Selection Committees of directors of many CSIR labs. He serves as Independent Director, on four renowned public limited companies: Aarti Industries Ltd, Godrej Industries Ltd, Meghmani Organics Ltd, and Bhageria Chemicals Ltd; and one private limited companies, Clean Science and Technology Pvt Ltd.

He is also a member of Apex Council of Indian Oil R&D; Expert Advisory Committee, ONGC Energy Centre (OEC); Glexcon India Advisory Board on Process Safety and the Governing Council DBT-IndianOil Energy Centre, and member of the DBT-Pan IIT Centre for Bioenergy. He is Chairman of DST's National Expert Advisory Committee on Innovation, Incubation and Technology Enterprise, member of Advisory and Screening Committee of the Common Research and Technology Development Hubs of DSIR, Chairman, PAC of International Programms in Chemical Sciences and Engineering, DST and Chairman, Expert Committee, Waste Management Technology, DST.

He had the honour of addressing 3 Convocations of renowned universities. He is fond of literature, etymology and Sanskrit. The ICT's University song is written by him. There are 47 video clips including documentaries on his life on YouTube.

Title: Role of Catalysis for the Sustenance of Chemical Industry



Dr. Raksh Vir Jasra
Senior Vice President & Head,
Reliance Technology Group,
Vadodara
Email : rakshvir.jasra@ril.com

Abstract

Talk will cover significance of chemical industry in maintaining present day lifestyle and role played by Catalysis in making chemical processes eco-friendly and energy efficient. Impact of global energy shift from fossil fuels to renewable fuels and growing demand of recycle economy on chemical industry will also be presented. Critical role catalysis is likely to play under changed environment for the sustenance and growth of chemical industry will be discussed.

CURRICULUM VITAE OF Dr. Raksh Vir Jasra

1	Name	Raksh Vir Jasra, FNAE
2	Educational Qualification	M.Sc. Delhi University, 1976 and Ph.D. from IIT, Delhi in 1981. Visiting scientist at Imperial College of Science & Technology, London (1989-1990).
3	Present Designation	Senior Vice President, Head, Reliance Technology Group, Vadodara Adjunct Professor RMIT, Melbourne, Australia. Honorary Professor, IAR University, Gandhinagar
4	Organisational details	Reliance Industries, Ltd., Vadodara; rakshvir.jasra@ril.com;
5	Specialization	Catalysis; Adsorption Separation; Nanomaterials; R&D Management and Leadership :Leading R&D groups for last 23 years
6	Past Employment Details	<ul style="list-style-type: none"> • Senior Vice President and Head, R&D, Centre, RIL Vadodara since March, 2008 onwards • Director Grade Scientist G, Head, Disc. Inorganic Materials & Catalysis, CSMCRI, Bhavnagar during Feb.2002- March, 2008 • Scientist F, Head, Discipline of Inorganic Materials and Catalysis and Discipline and Analytical Instrumentation, CSMCRI, Bhavnagar during Feb.1997- Feb. 2002 • Manager (R&D), IPCL, Baroda during June,1995-Feb.1997 • Deputy Manager(R&D), IPCL, Baroda during Sept.1990-June,1995 • Sr. Research Officer (R&D), IPCL, Baroda during Nov.1982-March 86
7	Number of Papers Published	Research Publications 300+ research articles including Seven Chapters in books and Eight Review articles published in national and international journals. 65 general articles on diverse scientific topics in Reliance in-house Newsletter Petrochemicals Spectrum. Google Scholar Citation Index = 10886; h- index =54; i10-index = 204 Research Gate Score = 45.3 Invited talk and Conference Presentations 150 invited talks in national and international forums.
8	Processes developed, Number of Patents in hand, Technical Reports, Ph.D. Thesis Supervision,	Processes Developed and Commercialized 52 chemical processes developed; 18 commercialized in Industry; 25 demonstrated up to pilot plant and 9 developed at lab scale. Patents Total granted patents = 180 out of which 63 US patents Patents in filed and pre-grant published stage = 200 Technical Reports 800 confidential technical reports from Reliance Industries Limited; IPCL, Baroda on in-house development/ trouble shooting in catalytic and adsorption processes at IPCL. Ph.D and M.Tech students guided 27 Ph.D. thesis 14 Post graduate students guided

9	Awards and other Recognition	<p>National Awards</p> <p><u>Team Awards</u></p> <ul style="list-style-type: none"> • Golden Peacock Award - 2019 for developing Waste to Value Creation – Development and commercialization of Low Cost Anti-Coking Additive for Naphtha / Gas Crackers and Sulfide Agent for Hydrotreater Catalysts from LPG Merox waste byproduct. Award Received from External Affairs Minister, UAE, Dubai on 6th March 2019 • 8th National Award for developing “Novel Polymer for High Performance Automotive Tyre Applications”. Award received from Shri M Venkaiah Naidu, Vice President of India, on 24th January 2019 • 15th Federation of Gujarat Industries Award for developing “Visible Light Mediated Photochlorination of PVC in Water for Generating CPVC”. Award received from Smt. Maneka Gandhi, Hon’ble Union Cabinet Minister for Women & Child Development on 14th April 2018 at Vadodara, Gujarat • Federation of Indian Chamber of Commerce & Industry (FICCI) Award – 2018 - for Manufacturing Process on "Low cost anti-coking additive for naphtha / gas crackers and sulfide additive for hydrotreater “ on 4th October 2018. • Golden Peacock Innovative Product Award – 2018 for developing “Novel DPE Polymer–Polymerization Process and New Product Developments for Armor & other Applications”. Award Received from IOD & Highness Sheikh N B M Al Hahyan, Cabinet Minister, UAE, Dubai on 17th April 2018. • 8th National award for technology innovation in Petrochemicals and Downstream Plastic Processing Industry for the Development of Novel Polymer for high Performance Automotive Tyre Applications by the Ministry of Chemicals and Fertilizers, Government of India, 2017. • Federation of Gujarat Industries award for excellence in Research in Science and Technology, Certificate of Merit for development of a process by visible blue LEDs light mediated photo chlorination of Poly Vinyl Chloride (PVC) to produce Chlorinated Poly vinyl Chloride (CPVC), 2018. • National Award for Technology Innovation in Petrochemicals and Downstream Plastic Processing Industry for the Development of High strength polymer tapes and fibres for ballistic application by the Ministry of Chemicals and Fertilizers, Government of India, 2016. • Federation of Gujarat Industries award for excellence in research, 2015. • Indian Merchants Chamber (IMC) Inclusive Innovation Award 2014, Certificate of recognition to Reliance Industries Limited for developing refinery sulfur based soil nutrient with multi-functional activity. • National Award for Technology Innovation in Petrochemicals and Downstream Plastic Processing Industry was for the Development of Self-Healing Rubber by the Ministry of Chemicals and Fertilizers, Government of India, 2015. • National Award for Technology Innovation in Petrochemicals and Downstream Plastic Processing Industry was for the Development of New Ultra High
---	-------------------------------------	--

	<p>Molecular Weight Polyethylene (UHMWPE) for defense applications by the Ministry of Chemicals and Fertilizers, Government of India, 2014.</p> <ul style="list-style-type: none"> • National Award for Technology Innovation in Petrochemicals and Downstream Plastic Processing Industry was for the Development of polymeric packaging for extending shelf life of agriculture, floriculture and horticulture produce by the Ministry of Chemicals and Fertilizers, Government of India, 2013. <p><u>Individual awards</u></p> <ul style="list-style-type: none"> • Fellow Indian National Science Academy, 2019. • Fellow of Indian National Academy of Engineering, 2008 • Fellow, Gujarat Science Academy, 2010 • Kullor Memorial lecture at Chemical Engineering department, IISc., Bangalore, 2012. • Bharat Jyoti Award for outstanding contributions and remarkable service by Indian International Friendship Society, New Delhi, 2012 • Vasvik Award for outstanding contribution in Chemical Science and Technology, 2011 • Prof. S K Bhattacharya Eminent Scientist Award of Catalysis Society of India for the year, 2008. • Prof. K.G. Naik Gold medal award for the year 2006 for outstanding contributions in applied chemical research, The M.S. University of Baroda • Fellow of Indian National Academy of Engineering, 2008 • Bronze medal for significant contributions to research in chemistry, Chemical Research Society of India (CRSI), 2007. • Professor B.D. Tilak visiting fellowship, University of Mumbai, Institute of Chemical Technology, Mumbai, 2006-07. • UPL distinguished speaker award of IChE at ChemCon, 2008
	<p>Internal awards in CSMCRI and Reliance Industries Limited</p> <p>Best Technology Award of Reliance Technology Group, 2011, 2012, 2013, 2014, 2015, 2017</p> <p>Best patent award, Central Salt & Marine Chemicals Research Institute, Bhavnagar, 2007.</p> <p>Best paper award in applied research, Central Salt & Marine Chemicals Research Institute, Bhavnagar, 2007.</p> <p>Dr. (Late) P. S. Mene Best patent award, Central Salt & Marine Chemicals Research Institute, Bhavnagar, 2004.</p> <p>Fellowships</p> <p>Post-Doctoral Fellowship, Imperial College of Science, Technology and Medicine, London, 1989-1990.</p> <p>Post-Doctoral Fellowship, CSIR, Delhi, 1982.</p> <p>Senior Research Assistant Fellowship, DST, Delhi, 1981.</p> <p>Junior/Senior Research Fellowship, IIT-Delhi, 1976-81.</p>

	<p>Merit award of Delhi University for B.Sc. (Hons'), Delhi University, 1974. National Merit Scholarship for Matriculation, Punjab University, 1969.</p> <p>MEMBERSHIP OF PROFESSIONAL BODIES / OTHER POSITIONS</p> <p>Dr. R.V. Jasra became President of Catalysis Society of India, 2019 Member, PAC on Chemical Engineering and Environment Engineering, SERB, Department of Science & Technology (DST), New Delhi. (2018-2021). Member Domain Expert Committee in Chemistry for STAS scheme of MHRD, 2019. Member Confederation of Indian Industry's' committee on Science and Technology, 2019. Member, PAC on Green Chemistry, Department of Science & Technology (DST), New Delhi. (2010-2016). Member Research Advisory Council (RAC), CSIR-IICT, Hyderabad; 2013-2016. Member Research Advisory Council (RAC), CSIR-IIP, Dehradun, 2013-till date; Member Research Advisory Council (RAC), CSIR-CSMCRI, Bhavnagar, 2017-till date Member Research Advisory Council, ERDA, Baroda, 2008 till date. Life member of Catalysis Society of India: President, 2018-2020; Vice president, 2013-till date; Secretary, 2003-2005; Member Indian Society for Surface Science and Technology Indian Society for Analytical Scientists - Vice Chairman of Baroda Chapter for the year 1994-95 - Treasurer of Baroda Chapter for the year 1995-96. Member American Nano Society, 2011 On the Editorial board of Bulletin of Catalysis Society of India.. Presently launched as New International Journal Catalysis in Green Chemistry and Engineering. Member, Board of Studies in Chemistry, 2006-2009, Bhavnagar University; IIS University, Jaipur; and M.S.University of Baroda, 2011-2014. Member on the National advisory Committee for establishing National Facility for Drug Discovery and Instrumentation support, Chemistry Department, Suarashtra University Recognized for guiding PhD students by Bhavnagar University Bhavnagar; D.D. Institute of Technology, Nadiad; National Institute of Technology (NIT), Surat; Gujarat Forensic Science University, Gandhinagar On the list of panel of referees for reviewing research Papers for Indian Journal of Chemistry – section A and Proceedings of Indian Academy of Science- Chemical Sciences, J. Physical Chemistry, ACS journal, Industrial Engineering Chemistry, J. American Oil and Chemists Society and J. Colloid Interface Science, J. Molecular Catalysis, Applied Catalysis.] R&D consultant, Kanoria Chemical Industries Limited (2007-2008)</p>
	<p>Workshop and Seminar organized</p> <ul style="list-style-type: none"> Organized CSIR-INSA (India), MOST-KOSEF (Korea) supported a Indo-Korea Workshop on Adsorbents and Adsorption Technologies at KIER, Daejeon, Korea from November 26-27, 2002 as a convener from India.

		<ul style="list-style-type: none"> • Convener of 17th National Symposium on Catalysis on the theme “Sustainable Development through Catalysis” jointly organized by Central Salt and Marine Chemicals Research Institute (CSMCRI), Bhavnagar and Catalysis Society of India (CSI) held at CSMCRI, Bhavnagar during 18-20, January 2005. • Seminar on Catalysis for Sustainable Development being organized on Jan.27-28, 2012 jointly with IChE regional Centre Baroda and Chemistry Department, MS University Baroda. • Seminar on Frontiers of Heterogeneous Catalysis HETCAT-2018 at M.S. University, Baroda Dec. 8-9, 2018.
--	--	--

Development of catalysts for the conversion of biomass derived compounds into value added compounds



Mannepalli Lakshmi Kantam

Dr. B.P. Godrej Distinguished Professor of
Green Chemistry and Sustainability
Engineering
J.C. Bose National Fellow (SERB-DST, GoI)
Department of Chemical Engineering
Institute of Chemical Technology, Matunga,
Mumbai, India

Abstract

Rapid consumption of fossil resources and environmental concerns over carbon footprint has triggered the research in the field of catalytic conversion of lignocellulosic biomass into chemicals. Biomass has been identified as a desirable alternative for production of fine chemicals/fuel additives because of its sustainability and often low cost, particularly biomass-derived levulinic acid is expected to become a major renewable feedstock. Development of highly efficient and cost effective catalytic processes for biomass conversion has been challenging and drawn the attention of researchers worldwide. Among the various biomass conversions, production of γ -valerolactone (GVL) and alkyl levulinates (ALs) has been fascinating due to the versatile applications of GVL and ALs as greener solvents, fuel additives and renewable raw materials to produce a broad spectrum of chemicals.

Cu/Ni hydrotalcite-derived catalysts have been prepared and used for liquid phase hydrogenation of levulinic acid (LA) into γ -valerolactone (GVL). Full conversion of LA with 100% selectivity towards GVL has been achieved. A series of UiO-66 based highly porous MOFs composed of either hafnium (Hf) or zirconium (Zr) clusters with varying linkers (UiO-66(Hf), UiO-66(Hf)-NH₂, UiO-66(Hf)-SO₃H and UiO-66(Zr)-SO₃H) have been prepared. They are highly efficient solid acid catalysts for the conversion of furfuryl alcohol (FA) or LA into ALs.

Catalytic conversion of 5-hydroxymethylfurfural (HMF) into furan-2,5-dimethylcarboxylate (FDMC) is of great significance in the production of polyethylene furanoate (PEF), a renewable biomass-derived polymer that can replace the fossil dependent polyethylene terephthalate (PET). We have reported for the first time the synthesis of FDMC in 92% yield by oxidative methyl-esterification of HMF using *tert*-butyl hydroperoxide (TBHP) as an oxidizing and methylating reagent catalyzed by mesoporous alumina nanospheres-embedded with CuO nanoparticles (CuO/m-Al₂O₃).

References:

- 1, Shyam Sunder R. Gupta, M. Lakshmi Kantam , Catal. Today, **2019**, 309, 189.
- 2, Shyam Sunder R. Gupta, M. Lakshmi Kantam , Catal. Commun., **2019**, 124, 62.
- 3, Shyam Sunder R. Gupta, A.Vinu , M. Lakshmi Kantam, J. Catal., **2020**, 389, 259.

BIO-DATA OF Prof. M. LAKSHMI KANTAM

1. Name : **Professor Mannepalli Lakshmi Kantam**

2. Current Position and Address : Dr. B. P Godrej Distinguished Professor
of Green Chemistry and Sustainability Engineering
Department of Chemical Engineering
Institute of Chemical Technology
Nathalal Parekh Marg, Matunga,
Mumbai-400019, India

3. Area of Specialization : Catalysis, Materials & Process Chemistry

4. Member: Govt Organisations

- ❖ Member, Atomic Energy Regulatory Board, DAE (Department of Atomic Energy)
- ❖ Member, Governing Body, Somaiya Vidyavihar University, Mumbai (2019- till date)
- ❖ Member, Board of Governors, IIT-Hyderabad, (2015- till date)
- ❖ Chairman, Department of Science and Technology–PAC (Inorganic and Physical Chemistry) (2018-2021)
- ❖ Member, CSIR-HRDG- Inorganic & Physical Chemistry Research Committee (2019-till date)
- ❖ Member, Research Advisory Council, GAIL, (2018-2021)
- ❖ Member, Experts committee for evaluation of Proposals for SAIF/SATHI Centres under SAIF Scheme, Department of Science and Technology (2019- till date)
- ❖ Member, Department of Science and Technology-FIST (Chemical Sciences) (2015-till date)
- ❖ Member, Selection Committee, Raja Ramanna Fellowship Scheme, DAE (Department of Atomic Energy)(2013- till date)
- ❖ Member, RAC-DRDO (2015-till date)
- ❖ Member, Research Council, HEMRL(High Energy Materials Research Laboratory), Pune (DRDO)(2015-tilldate)
- ❖ Member, Standing Committee for Promoting Women In Science, Department of Science and Technology (2016-till date)
- ❖ Member, Advisory and Steering Committee to frame policy document on Scientific Social Responsibility(SSR) (2019- till date)
- ❖ Member, Third Party Evaluation Committee for all R& D Schemes of DST(2019-till date)
- ❖ Member, DST-JSPS council, DST (2015-till date).
- ❖ Director, CSIR-Indian Institute of Chemical Technology, Hyderabad (2013-2015)

5. Board Member: Companies

- ❖ Non-Executive Independent Director, Godavari Biorefineries Ltd.(2017- till date)
- ❖ Non-Executive Independent Director, Indo-Amines Ltd.(2017- till date)

❖ Non-Executive Independent Director, Vinati Organics Ltd.(2019- till date)

7. Academic/Research Experience/Employment:

S.N.	From	To	Name of the Organization	Position held
1	July1982	July1983	JMJ College for Women, Tenali	Lecturer
2	Aug.1983	Sep.1984	Regional Research Laboratory, Hyderabad	PostDoc. Fellow
3	Oct.1984	Nov.1989	Regional Research Laboratory, Hyderabad	Scientist B
4	Dec. 989	Nov. 1994	Regional Research Laboratory, Hyderabad	Scientist C
5	Dec. 1994	April 2001	Indian Inst. of Chem. Tech., Hyderabad	Scientist E-I
6	May 2001	April 2006	Indian Inst. of Chem. Tech., Hyderabad	Scientist F
7	May 2006	April 2013	Indian Inst. of Chem. Tech., Hyderabad	Scientist G
8	April 2013	March2015	Indian Inst. of Chem. Tech., Hyderabad	Director
9	April 2015	Nov. 2015	Tezpur Central University, Tezpur	Professor
10	Dec. 2015	Till date	Institute of Chemical Technology Mumbai	Professor

8. Select List of Honors and Awards :

- ❖ 2019- Goyal Award, Applied Sciences, Kurukshetra University, Kurukshetra
- ❖ 2019- ICC -D.M.Trivedi Life time Achievement Award
- ❖ 2018- Fellow of The World Academy of Sciences (TWAS)
- ❖ 2017-Devang Mehta – National Education Award (Women in Education Award)
- ❖ 2016- Fellow of the Maharashtra Academy Sciences
- ❖ 2016-Professor Darshan Ranganathan Memorial Lecture Award , INSA
- ❖ 2016-Asian Paints Padma Vibhushan Dr. R. A. Mashelkar Medal and Chemcon Distinguished Speaker Award (For leadership in Science, Technology and Education)-CHEMCON-2016
- ❖ 2015- J.C.Bose Fellowship (SERB-DST)
- ❖ 2015-till date – Adjunct Professor, Tezpur Central University, Tezpur, Assam
- ❖ 2015- Eminent Scientist Award – Catalysis Society of India.
- ❖ 2014- Fellow of the Indian National Science Academy
- ❖ 2013 – Fellow of The Royal Society of Chemistry, UK
- ❖ 2011- Vasvik Award
- ❖ 2011 - Lifetime Achievement Award, Indian Chemical Society, 2011
- ❖ 2008 – Fellow of National Academy of Sciences, India
- ❖ 2008-till date – Adjunct Professor, RMIT University, Melbourne, Australia

- ❖ 2008- B.D. Tilak Visiting Fellow, UICT, Mumbai
- ❖ 2007 – RMIT Foundation Fellowship Award, RMIT Uni, Australia
- ❖ 2006- Fellow of Andhra Pradesh Akademy of Sciences, Hyderabad
- ❖ Editorial Board Member, Chemical Record (TCR), Wiley-VCH.
- ❖ Editorial Board Member, Journal of Chemical Sciences, Springer Publishers.
- ❖ Associate Editor, Catalysis in Green Chemistry and Engineering, Begell house

9. Professional affiliations:

- ❖ Catalysis Society of India (life member)
- ❖ Chemical Research Society of India, Bangalore, India (life member)

10. Publications: 339 (Peer Reviewed Journals) Citations: 15049, h-index: 65

11. Number of books authored/edited: 5

12. Number of patents granted / filed: 52

13. Dissertations supervised: Ph.D. 41

14. Present Industry Collaborations: GBL, VOL, Hikal Ltd, Indo Amines Ltd, Kesar Petroproducts Ltd, GACL, Marvel Drugs , Mangalam Organics etc.

Making and breaking things using synthetic biology



Prof. Vikramaditya G. Yadav,
Associate Professor,
Department of Chemical & Biological
Engineering and
The School of Biomedical Engineering and
Director of the Master of Engineering
Leadership in Sustainable Process
Engineering,
University of British Columbia (UBC),
Canada.
Email : vikramaditya.yadav@ubc.ca

Abstract

The principal theme of Prof. Yadav's research is the utilization of metabolic & enzyme engineering to investigate and customize novel biosynthetic enzymes that can convert biomass-derived feedstocks into value-added chemicals. His group also extends the principles of metabolic engineering to the design and development of unique bioremediation strategies to rehabilitate the water quality in and around industrial zones and develop new mining biotechnologies. In addition to green engineering, his research group also pursues medical biotechnology research, and focuses on bioengineering for assay development, lead generation and product development. The seminar will provide a broad overview of the research and commercialization efforts that are afoot in his laboratory at UBC. In particular, the talk will cover some of his group's recent successes in elucidating and using a novel plant metabolic pathway for the synthesis of value-added chemicals, the development of a biosensor for screening insect repellants, bioremediation of oil sands tailings ponds and the fabrication of biohybrid materials for harvesting solar energy.

Biography

Vikramaditya G. Yadav is an Associate Professor in the Department of Chemical & Biological Engineering and the School of Biomedical Engineering and Director of the Master of Engineering Leadership in Sustainable Process Engineering at the University of British Columbia (UBC). He received his BASc degree from the University of Waterloo in 2007 and his PhD degree from the Massachusetts Institute of Technology (MIT) in 2013. He then went on to conduct post-doctoral research at Harvard University and subsequently joined UBC in 2014. Prof. Yadav leads a world-leading, industrially-connected, interdisciplinary research group that investigates topics at the interface of biology, chemistry, engineering and medicine. His research program is distinguished by its impact and strong emphasis on technology translation, and his group currently collaborates with as many as 7 companies. He is presently the Chair of the Biotechnology Division of the Chemical Institute of Canada, an Associate Editor of *Catalysis in Green Chemistry & Engineering* and the *Canadian Journal of Chemical Engineering*, and he was previously an Associate Scientific Advisor for Science Translational Medicine,. He is also the Chief Technology Officer of Metabolik Technologies Inc., an environmental biotechnology company, and serves on the boards of InMed Pharmaceuticals and Reagent.

-  **Catalysis Division**
-  **Technology Division**
-  **Chemical Division**



AdiChem Technology Pvt. Ltd.
Create | Enhance | Sustain
www.adichemtechnology.com

For Catalyst and Adsorbent, we deal with:

-  Sourcing and supply of products
-  Raw materials to undertake manufacture
-  Characterisation
-  Technical support for application development and reuse of spent catalyst
-  New product development projects

We can offer following products:

-  Adsorbents: Alumina and Molecular sieves
-  Catalysts: Heterogeneous and heterogeneous (alumina and zeolite based)
-  Catalysts precursors
-  Bed Supports
-  Clay and Minerals











AdiChem Technology Pvt. Ltd. is a young organisation formed by professional Scientists and technologists.

Foundation of AdiChem Technology is based on the approach of strengthening the Scale-up; the important missing link in India to convert laboratory catalyst to industrial catalyst. Another important focal area is to develop or source the appropriate catalyst or adsorbent based on customer's application requirements.

Our Catalyst and Adsorbent division provide solutions for product scale-up to achieve required mechanical, physical, surface, crystallographic, chemical properties by maintaining the desired activity and stability of industrial catalyst and adsorbents. The process like digestion, synthesis, precipitation, crystallisation, filtration, drying, catalyst particle formation, impregnation, chemical treatments and activation are involved. Procedures for process control, quality control, characterisation and performance evaluation are developed. We also source the appropriate binder, forming agents, support material and chemicals intermediates required for impregnation and chemical treatment. All this enables the transition from scale-up to next stage of catalyst manufacture.

For spent catalyst, we provide solutions for precious metals recovery, recycling & also the regeneration part. We undertake projects to develop catalyst or adsorbent based on application requirement of customer.

Our Technology division design and provide laboratory and pilot plant set-ups for catalytic application development. Various reactors assemblies with required level of control systems and automations are developed and supplied. Our combined strengths in R&D, scale-up and Technology enables us to provide solutions in the area of catalyst manufacturing and application development.

-  Advance Lab Scale Continuous Reactor Units
-  Bioreactors/Fermenters (Biostream Make)
-  Plug flow reactor System
-  Micro Reactor System
-  Autoclaves
-  Pilot Scale Unit
-  Catalytic Reactor System
-  Waste water treatment set-up
-  Glass reactors
-  Customised High Pressure & Temperature reactors units



CONTACT TO US

Address: C-12/1, NICE Area, MIDC Satpur, Nashik, MH, India-422007.

Contact No: 9028078783/9867327615

Email Id: info@adichemtechnology.com

Website: www.adichemtechnology.com

catalysts & adsorbents **SOLUTION**



Manufacturer and Exporter of :

- Chloride Guard Catalyst
- Catalyst Carrier
- Molecular Sieves
- Claus/SRC Catalyst
- Pseudoboehmite Carrier
- Inert Ceramic Support Ball
- Zinc Oxide Catalyst
- Activated Alumina
- Alumina Balls



REFINING CHEMISTRY

(Formerly known as Devson Insulators Private Limited)

DEVSON CATALYST PVT. LTD.

Plot No. 214, Phase-2, GIDC, Ambawadi,
Wadhwan. Dist: Surendranagar (Gujarat) **INDIA**

email: sales@devsongroup.com

call: **+91 93777 10244 | +91 99799 96961**