Dr. Yogeshwar R. Suryawanshi

Curriculum Vitae

Contact

Address: **Present:** Technical & Applied Chemistry Department, VJTI, Central Technological Institute of Government of Maharashtra, Mumbai, 400019, India.

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Education

2011-2017 **Doctor of Philosophy in Chemistry,** SV National Institute of Technology Surat (SVNIT), India. (Awarded October 2017)

2007-2009 **Master of Science in Organic Chemistry,** Pratap College Amalner, North Maharashtra University, Jalgaon, India.

2004-2007 **Bachelor of Science in Chemistry,** SSVPS Science College Dhule, North Maharashtra University, Jalgaon, India.

Professional Experience

- **Teaching: As Assistant Professor**

2018-Till Date: **Designation:** Assistant Professor,
Technical and Applied Chemistry Department,
Veermata Jijabai Technological Institute (VJTI), Central Technological Institute, Maharashtra State Government, India.

2017-2018: **Designation:** Assistant Professor,
Department of Chemistry, Marwadi University (NAAC A+ accredited institution & Centre of Excellence (CoE) status by Gujarat State Government, Gujarat, India.

- **Research: As Project Assistant, Researcher, JRF & SRF**

2009-2011 **Designation:** Project Assistant & Researcher,
CSIR-National Chemical Laboratory (NCL), Pune, Maharashtra, India.

2011-2013 **Designation:** Junior Research Fellow, Board of Research in Nuclear Sciences BARC, Mumbai & SV NIT, Surat India.

2014-2016 **Designation:** Senior Research Fellow, Council of Scientific & Industrial Research, BARC, Mumbai & SV NIT, Surat India.

Research Experience

2009-2011 **Research Project Assistant,** CSIR-National Chemical Laboratory (NCL), Pune, Maharashtra, India.

1. Project: **Development of a continuous process for Biodiesel/Biolubricants.**
Funding Agency Benefuel, Texas, USA.
Supervisor: Dr. D. Srinivas & Dr. T. Raja (Principal Scientist), Catalysis Division, NCL.
Description: In this work, I have worked on the preparation of Nano & Meso catalyst with different combination and their physicochemical characterization studies. Experimental investigations of prepared catalyst for batch and gas phase reaction flow in a continuous fixed bed reactor for 200 hr under same/different operating conditions.

2. Project: **Catalytic Hydrogenolysis of Glycerol 1,3 Propanediol**
Funding Agency New Millennium Indian Technology Leadership Initiative (NMITLI), Council of Scientific & Industrial Research (CSIR), Government of India, India
Supervisor: Dr. C. V. Rode (Chief Scientist), CEPD Division, NCL.
Description: In this work, I have worked on the additive effect of promoter on catalyst such as Al, Ba and Zn separately and with their combination, on the activity and selectivity of copper chromite catalysts for hydrogenolysis of glycerol. For this purpose, copper chromite catalysts with different combinations of aluminum, barium and zinc were prepared by co-precipitation method and screened for glycerol hydrogenolysis reaction. Experimental investigation was carried out for batch and continuous fix bed reactor for 800 hr with same/different operating conditions.

3. Project: **The total synthesis of Aplidiopasmine-A as Antimalerial Drug**
Funding Agency Department of Science & Technology (DST), Government of India, India.
Supervisor: Dr. Santosh B. Mhaske (Principal Scientist), Organic Chemistry Division,NCL
Description: In this project my major key roles are to perform total synthesis of Aplidiopsamine A and Marinoquinoline. High antimalarial activity and minimal toxicity toward human cells, they represent novel lead structures that could be further developed into antimalarial drugs; hence a diversity oriented practical synthetic approach is essential for their SAR studies. This prompted me to think and initiate studies toward the total synthesis of marine natural products Aplidiopsamine A, Marinoquinoline A-F, and their potential analogues.

2011-2014 **Junior Research Fellow (JRF)** Board of Research in Nuclear Sciences, Bhabha Atomic Research Centre (BARC), Department of Atomic Energy, Government of India & SV National Institute of Technology, Surat, India.
Synthesis of alumina supported ruthenium nanocatalyst for studies on

Project: feasibility in application to hydrogenation of benzo crown compound

BARC, Department of Atomic Energy, Government of India, India

Funding Agency Dr. Sulekha Mukhopadhyay (Group Leader & Scientist), BARC, Mumbai, India

Supervisor: Prof. Dr. M. Chakraborty (Professor), SV NIT Surat, India

Description: My main task in this project which is a part of my PhD thesis is to develop new catalysts system, which would be effective providing selective products in hydrogenation reaction of aromatics compounds under milder conditions, Rh/γ-Al_2O_3 and Rh-Ni/γ-Al_2O_3 , Rh-Pd/γ-Al_2O_3 bimetallic nanoalloy catalysts (different wt. %) was synthesized by bottom up approach (e.g. solvothermal/microemulsion techniques). Synthesis of supported catalyst on different metal support was carried out. Preparation of bimetallic colloids was done by reduction of the appropriate mixture of salts in the solution phase using reducing agents. In a mixture of Rh-Ni/Rh-Pd salt, during the solvothermal reduction process, the metal species with the higher redox potential (Rh) generally precipitates first, forming a core on which the second component (Ni/Pd) is deposited as a shell.

2014-2017 **Senior Research Fellow (SRF)** Council of Scientific & Industrial Research, Government of India, India.

Thesis Title: **Synthesis of noble metal Nanoparticles by Microwave Irradiated Solvothermal Technique and their catalytic applications.**

Funding Agency Council of Scientific & Industrial Research, Government of India, India.

Supervisor: Prof. Dr. M. Chakraborty (Professor), ChED, SV NIT, Surat, India

Prof. Dr. Smita Jauhari (Professor), Applied Chemistry Department, SV NIT, Surat, India.

Description: In this work, I have developed a new catalytic system with high probability for commercialization. The method includes synthesis of noble metal mono and bimetallic nanoparticles by various methods and mainly by microwave irradiated solvothermal technique using glycerol as a dual player (Solvent + Reducer) and in presence of capping agent. Synthesized nanocatalyst was examined for various organic reactions such as high pressure selective hydrogenation of Aromatic analogue, Phenol, Gamma Valerolacton, Di-benzo-18-crown-6 ether (DB18C6) and Di-tert-butyldibenzo-18-crown-6 ether (DTBDB18C6). Hydrogenation of DB18C6 and DTBuB18C6 produce DCH18C6 and DTBuCH18C6 respectively, which are potential extractants for Sr^{2+}. Strontium-90 (^{90}Sr) is produced from nuclear reactor due to nuclear fission. The developed method is of high significance towards the development of selective extractants for nuclear waste. I had developed synthesis method for nanoparticle which may adopted by the industries as a substitute for regular method owing to simplicity and low cost of production. Synergistic effects (the mutual influence of different neighboring atoms) of

the bimetallic nanoalloy catalyst was studied. The effect of individual catalyst on the conversion and selectivity of benzo crown compound hydrogenation and in combination was investigated. Evaluation of performance in hydrogenation substituted benzo crown compound also done with synthesised monometallic (Rh) and bimetallic catalysts (Ru-Ni/Pd) with various processes.

Key Contributions as a Research Scholar at NCL, BARC & NIT

- Development of sustainable catalytic system for high pressure gas phase fixed bed and basket reactor. (Project received "CSIR Technology Award – 2015" from government of India – worked as a team member)
- Synthesis of batch to pilot scale nano monometallic and bimetallic catalyst & Investigation of catalytic activity with benzo crown compounds and benzen alagougs. (Project received "Bhabha Gold Medal – 2016" from Department of Atomic Energy, Government of India – worked as a team member)
- Testing sythesized nanocatalyst & zeolite in conversion of bioplatform molecules Levulinic acid to blending fules like 2-MTHF (Selected in "Young Scientist Conclave Presentation" in International Science Festival)
- Natural product synthesis & target compounds utilizing a blend of both classical and modern technology effectively.
- Validation & testing of Nano & Meso, mono & bimetallic catalysts supported on different support ZSM -22, alumina, zirconia, gamma alumina on Pilot scale with different parametric effect for continuous 1000 hr.

Master Thesis

Title: Synthesis & Antibacterial Activity of (Z)-1-(3,5-diphenyl-4,5-dihyrdo-1H-pyrazol-1- yl)-2-(phenyldiazenyl)ethanone

Description: In this work, I have worked on the synthesis of potential antibacterial alagoues and characterisation of (Z)-1-(3,5-diphenyl-4,5-dihyrdo-1H-pyrazol-1-yl)-2-(phenyldiazenyl) ethanone.

Research Skills

- Expertise in Heterogeneous catalysis, selection and design of catalysts for diverse processes.
- Experience in the characterization of catalysts using SEM, SEM–EDX, SAXS, SANS, HRTEM, Powder XRD.
- Expertise in handling high pressure reactions in bench and fixed bed
- reactors.
- Capable of carrying independent and collaborative research.
- Profound efficiency in handling of hydroscopic, air sensitive reagents and reactions using glove box and schlenk / vacuum line techniques.
- Experience in carrying out the reactions at low temperatures. Skilled in presentations, paper writing and project conception and project implementation.

Research Consultancy Handled

Title: **"Performance assessment report of the Zero Liquid discharge system"**

Team Members: Dr. Sujatha Parmeswaran (Head of Department) & Dr. Pankaj Pardeshi

Sponsoring Agency: VIVID GLOBAL INDUSTRIES LTD. An ISO 9001:2015 Certified Company Plot No. D-21/1, MIDC Tarapur, Maharashtra – 401506, India. (Year 2020-2021)

Amount: 5 Lakhs

Teaching

- 02CY0202 – Fundamental Chemistry FCH-III (BSc Programme, 3 Credits, 45L, 3h per week)
- 02CY0503 – Heterocyclic Chemistry HS (MSc Programme, 2 Credits, 40L, 4h per week)
- R4CH1011T – Applied Chemistry – I (BTech Programme, 2 Credits, 30L, 3h per week)
- R4CH1021T – Applied Chemistry – II (BTech Programme, 2 Credits, 30L, 3h per week)
- R4CH2001ST – Environmental Studies (BTech Programme, MNC, 25L, 2h Per week)
- 175CH56 – Renewable Energy Technology DCHE-V (Diploma in Chemical Engineering, 2Credits, 30L, 3h per week)
- 175CH36 – Chemical Lab Safety Professional Practices (Diploma in Chemical Engineering, EC, 30L, 3h per week)
- 175CH51 – Industrial Training (Diploma in Chemical Engineering, Research Course, Odd Semester)

Academic Activities / Roles & Responsibilites

Research Activity: Departmental level minor project: As Principal Investigator

- "Sustainable Synthesis of Carbon or Platform and Fine Chemicals from Biomass"
- Mentor for UG students for National Level Competition, organised by Confederation of Indian Industry (CII) (Two project selected for final level)
- Judge for National Science Day Godrej School, Mumbai.

Student's Supervised: Mentor for School to College students for various science project competition

1. **Ph.D.: 2 – As Co-guide (A.Y. 2019 – 2023)**
2. M.Sc.: 1 – As Guide (A. Y. 2018-19)
3. MTECH: 1 – (A. Y. 2017-18)
4. BTECH : 3 – (Summer Internship - A.Y. 2016-2017)

Departmental Activity: Departmental Activities assigned by Head of the Department like lab incharge, Department level committee for a minimum period of one year:

- Institute Innovation Committee Member & Innovation Ambassador (IIC), by Ministry of Eduction's Innovation Cell, All India Council for Technical Education (AICTE), Government of India.

Admission Committee Member (2019-2022)

Time Table Coordinator (2019-2022)

- First year Committee Member for undergraduate courses (2020-2021)

National Level Conference/Workshop:

Coordinator:

- "Smart synthesis technique for smart materials and their application in Science & Engineering" during January 2020.

MOU:

Memorandum of Understanding (MOU) between Clean Chem Laboratories pvt. ltd. Vashi, Mumbai; Emcure pharama Pune with VJTI Mumbai. (A.Y. 2020-2023 In Process)

Social Initiatives:

Projects & Role:

- Conducted Community Project on "Plastic Ban in India" as part of academic project base learning scheme, during April 2019 at Matunga, Mumbai.
- Coordinator for MPC (Multilayer Plastic Collection) drive. (A.Y. 2019-20)
- Part of 1st & 2nd Annual Tata Centre Training & Design Symposium: Innovate
- to Transform, in collaboration with MIT, USA & IIT, Bombay.

Faculty Development Programme/courses:

FDP:

- Indo Universal Collaboration for Engineering Educator (IUCEE), International Engineering Educator Certification Program (IIEECP), FDP – 1 & 2 (Faculty Development Programme – Phase-1 & 2), Marwadi University, Rajkot.
- Completed course on "Surface Engineering of Nanomaterials" on SWAYAM, National Programme on Technology Enhanced Learning (NPTEL), IIT Roorkee.
- Selected as Translator for MOOCs - Massive Online Open Courses, National Programme on Technology Enhanced Learning (NPTEL), Study Webs of
- Active-Learning for Young Aspiring Minds (SWAYAM), Minstry of Human Resource and Development, New Delhi, India.
- Completed Innovation Ambassador Foundation & Advanced Level
- Certification Programme by Ministry of Education's Innovation Cell & IIC, Government of India, Nominated by VJTI, Mumbai.

Expert talk delivered in FDP's/Institutes:

Invited Talks:

Expert talk delivered in five day FDP at K.K. Wagh Institute Of Engineering Education & Research – (KKWIEER), Nasik, Maharashtra on topic "Managing nuclear waste using crown ethers" 19th - 20th January 2021.

- Expert lecture delivered at K.K. Wagh Institute Of Engineering Education & Research – (KKWIEER), Nashik, Maharashtra, on topic "Challenges in Catalysis: Their Reactions and Diverse Applications" 27th August 2020.

Expert lecture delivered at SNP's Institute of Technology and Research Centre, Umarkh, Surat, on Topic "Yes I Can" on 6th October 2018.

Expert lecture delivered at Government Engineering College, Bhuj, Gujarat, on topic "Catalysis mediated chemical reactions and its applications in various fields" 3rd October 2017

Instrument Handling Skills

- Powder X-Ray Diffractometer (Bruker Axs Smart–Apex CCD)
- High Pressure Liquid Chromatography (HPLC Shimadzu)
- Gas Chromatography (Agilent Technologies)
- Dynamic Light Sclattering & Zeta potential (Zetasizer, Germany)
- FT-Infra Red Spectrometer (Nicolet Protege 460)
- TGA & DTA (Pyris Diamond TG/DTA,Perkin Elmer)

Software Skills

- Supervisory control and data acquisition software for Laboratory & Industrial application (SCADA).
- Chemistry related and other software: CHEM DRAW, ISIS DRAW, ACD NMR, Origin, Irfan View, PCPDF WIN (For JCPDS) etc.
- Origin, Microsoft office, Mendeley, Endnote

Awards/Fellowship

2011-2013	Research Fellowship, Board of Research In Nuclear Sciences (BRNS), BARC, Department of Atomic Energy, Government of India.
2014-2016	CSIR - Senior Research Fellowship, Council of Scientific & Industrial Research, Ministry of Science & Technology Government of India.
January 2015	Best Poster Award ICGCE-2015, (International Conference on Green Chemistry: Catalysis, Energy and Environment) during 22-25th January 2015, Goa, India.
August 2016	International Travel Grant, Technical Education Quality Improvement Program (TEQIP), NIT Surat to attend an International Conference in Jeju, South Korea.
September 2019	Registration grant, Magnus Conference Group, & VJTI Mumbai, Government of Maharashtra, to attend an International Conference in Middlesex, Heathrow, London.
Septenber 2019	Moderator Award at "5th Edition of Global Conference on Catalysis, Chemical Engineering and Technology (CAT-2019)", during 16th to 18th September 2019 at Radisson Conference Centre, Bath Road, Heathrow, Middlesex, London, UK.
June – August 2020	External Mentor for Council of Scientific & Industrial Research_Summer Research Training Programme - 2020 in CSIR-NEIST, Assam, India.
September 2020-21	Young Scientific Leader for Virtual Internship Programme with Central University of Punjab, Ministry of Human Resource & Development, India.
November 2021-22	Member of Board of Studies for K.K.Wagh Education and Research Institute, Nasik Maharashtra Aproved by S.P.P.U Pune.
May 2021-22	Winner of TOYCATHON – 2022 Physical addition, Organized by Government of India.
November 2021-22	Winner of Climate Hackathon Challenge 2.0 – 2022 AICTE Delhi, Organized by ESF & AICTE, New Delhi.
May 2020	Life Membership by Society for Technologically Advanced Materials (STAMI), India (Membership ID: LM-CS-0757)
April 2019	Life Membership "Fellow Member Eudoxia Research Centre (FMERC), International Research Centre for Innovation, India. (Membership Fellow ID: FMERC/ERC/2019/0075)
June 2013-2016	Sports Secretary of Hostel 2013-16, & Hostel committee member, SV National Institute of Technology (SV NIT), Surat.

Publications in Peer-Reviewed International Journals

(1) Mugdha Dongare, V. B. Suryawanshi*, Yogeshwar R. Suryawanshi, Sujatha P. **3D printed cellulose nanofiber-PLA nanocomposites: Experimental investigations and multi-objective optimization** International Journal of Materials Engineering Innovation, DOI: 10.1504/IJMATEI.2023.10056989

(2) Mugdha Dongare, V. B. Suryawanshi*, Yogeshwar R. Suryawanshi, Sujatha P "Preparation and Characterization of 3D Printed Bio-composites containing Carica Papaya Cellulose Nanofibers" International Journal of Materials Engineering Innovation, DOI: 10.1504/IJMATEI.2023.10058893

(3) Yogeshwar R. Suryawanshi, M. Chakraborty*, S. Jauhari, S.Mukhopadhyay, K.T.Shenoy. **Hydrogenation of Dibenzo-18-Crown-6 Ether Using γ-Al2O3 Supported Ru-Pd and Ru-Ni Bimetallic Nanoalloy Catalysts**. International Journal of Chemical Reactor Engineering, vol.17(4), 2019, pp. 20180049.

(4) Yogeshwar R. Suryawanshi, Mousumi Chakraborty*, Smita Jauhari, Sulekha Mukhopadhyay, Krishna T.Shenoy. **Selective hydrogenation of 4' ,4''(5'')-di-tert-butyldibenzo-18-crown-6 ether over Rh/γ-Al_2O_3 nanocatalyst**. International Journal of Chemical Reactor Engineering, vol. 15(1), 2017, pp. 20150204.

(5) Yogeshwar R. Suryawanshi, M. Chakraborty*, S. Jauhari, S. Mukhopadhyay, K.T.Shenoy, D. Sen. **Selective Hydrogenation of Dibenzo-18-crown-6 ether over Highly Active Monodisperse Ru/γ-Al_2O_3 Nanocatalyst**. Bulletin of Chemical Reaction Engineering and Catalysis, vol. 10(1), 2015, pp. 23-29.

(6) Yogeshwar R. Suryawanshi, M. Chakraborty*, S. Jauhari, S. Mukhopadhyay, K. T. Shenoy, and R. Shridharkrishna. **Microwave irradiation solvothermal technique: an optimized protocol for size-control synthesis of Ru nanoparticles**. Crystal Research and Technology, vol. 48(2), 2013, pp. 69-74.

(7) A. N. Raut, S. U. Nandanwar, Y. R. Suryawanshi, M. Chakraborty*, S. Jauhari, S. Mukhopadhyay, K. T. Shenoy, H.C.Bajaj. **Liquid phase selective hydrogenation of phenol to cyclohexanone over Ru/γ-Al_2O_3 nanocatalyst under mild conditions**. Kinetics and Catalysis, vol. 57(1), 2016, pp. 42-48.

(8) Jyoti P. Mahajan, Yogeshwar R. Suryawanshi, and Santosh B. Mhaske*. **Pd Catalyzed Imine Cyclization: Synthesis of Antimalarial Natural Products Aplidiopsamine A, Marinoquinoline A, and Their Potential Hybrid NCLite-M1**. Organic Letters ,vol. 14(22), 2012, pp. 5804-5807.

(9) R. B. Mane, A. A. Ghalwadkar, A. M. Hengne, Y. R. Suryawanshi, C. V. Rode*. **Role of promoters in copper chromite catalysts for hydrogenolysis of glycerol**.
Catalysis Today, vol. 164, 2010, pp. 447-450.

Communicated & Accepted Manuscript : 2

Book Chapter:

(1) Isha Misra, Riya Parikh, Alisa Chakraborty, Yogeshwar R. Suryawanshi, Mousumi Chakraborty*. "**Synthesis of Ruthenium Nanoparticles by Microwave Assisted Solvothermal Technique**". Materials, Energy and Environment Engineering. Springer, Singapore.
(DOI: https://doi.org/10.1007/978-981-10-2675-1_6)

Patents

(1) **Capacitive deionization system for seawater desalination**. Omkar Prakash Shetye, Dr. Pankaj Pardeshi, Amol Sonawane, Dr. Yogeshwar R. Suryawanshi, Dr. Sujatha Parmeswaran. Accepted Application Number :- 365453-001

(2) **Ultrasonication Assisted Hollow Fiber Membrane Module**. Amol Sonawane, Dr. Pankaj Pardeshi, Dr. Yogeshwar R. Suryawanshi, Dr. Satish Rikame. Accepted Application Number :- 365255-001

(3) **Water Filtration Setup**. Amol Sonawane, Dr. Pankaj Pardeshi, Dr. Yogeshwar R. Suryawanshi, Dr. Satish Rikame. Accepted Application Number :- 365256-020

(4) **Water Filtration setup using ultrasonication**. Amol Vijay Sonawane, Dr. Pankaj Madansingh Pardeshi, Suransh Jain, Dr. Mahendra Shivaji Gaikwad, Dr. Yogeshwar Rajendra Suryawanshi, Balaji Sopanrao Dhopte, Dr. Satish Sukdeo Rikame, Dr. Mahesh Radhakrushna Gadekar, Shaikh Mohsin Mohammed Ismai. Accepted Application Number :- 372773-001

(5) **Deshbhraman (Heritage game using sustainable materials), India**. Dr. Yogeshwar Suryawanshi, Nandini Gaikwad, Srushti Labhade, Shivani Walavalkar, Payal Sargar, Shruti Salunkhe. Accepted Application Number :- 366132-001

National/International Conference Papers/Posters

(1) **Yogeshwar R. Suryawanshi**, Mousumi Chakraborty*, Smita Jauhari, Sulekha Mukhopadhyay, Krishna T. Shenoy, Sujatha Parmeswaran. "Hydrogenation of Dibenzo-18-crown-6 ether using γ-Al_2O_3 supported Ru-Pd and Ru-Ni bimetallic nanoalloy catalysts" accepted for presentation in 5th Edition of Global Conference on Catalysis, Chemical Engineering and Technology (CAT-2019), during 16th to 18th September 2019 at Radisson Conference Centre, Bath Road, Heathrow, Middlesex, London, UK.

(2) **Yogeshwar R. Suryawanshi**, Mousumi Chakraborty*, Smita Jauhari, Sulekha Mukhopadhyay, Krishna T. Shenoy. "Hydrogenation of Dibenzo-18-crown-6 ether using γ-Al_2O_3 supported Ru and Rh nanocatalysts" accepted for paper presentation in ACEM-2016, The 2016 World Congres on Advances in Civil, Environmental, & Materials Research, during 28th August to 1st September 2016, at Jeju, South Korea.

(3) **Yogeshwar R. Suryawanshi**, Mousumi Chakraborty*, Smita Jauhari, Sulekha Mukhopadhyay, Krishna T. Shenoy. "Green Synthesis of Metal Nanoparticles and Their Dynamic Applications" accepted for Young Scientist Conclave poster presentation in IISF – 2016, 2nd India International Science Festival during 7th to 11th December 2016, at National Physical Laboratory (NPL), Delhi, India.

(4) **Yogeshwar R. Suryawanshi**, M. Chakraborty*, P. A. Parikh*, S. Jauhari. "Tailored Synthesis Of Ru Nanoparticle By Microwave Assisted Technique and It's Application In Hydrogenation Of Crown Ethers" accepted for poster presentation in ICGCE-2015, International Conference on Green Chemistry: Catalysis, Energy and Environment during 22nd to 25th January 2015, University of Goa, Goa, India.

(5) **Yogeshwar R. Suryawanshi**, M. Chakraborty*, S. Jauhari, A. U. Renjith, R. B. Chinchale, S. Mukhopadhyay, K. T. Shenoy. "Synthesis of Ruthenium Nanoparticles by Microwave Irradiated Solvothermal Technique for the Hydrogenation of Crown Ether" accepted for poster presentation IMSC - 2012, 4th Interdisciplinary Symposium on Material Chemistry (SMC), during 11th to 15th December 2012, Bhabha Atomic Research Centre, Mumbai, India.

(6) Isha Misra, Riya Parikh, **Yogeshwar R. Suryawanshi**, M. Chakraborty*. "Synthesis of Ruthenium Nanoparticles by Microwave Assisted Solvothermal

Technique" accepted for paper presentation in ICACE – 2015, International Conference on Advances in Chemical Engineering during 20nd to 22th December 2015, at National Institute of Technology Surathkal (NITK), India.