

REVIEW REPORT
DEPARTMENT OF CHEMISTRY
17 January 2014



INDIAN INSTITUTE OF TECHNOLOGY ROPAR
NANGAL ROAD, RUPNAGAR, PUNJAB

Section A: Faculty, Students and Research Activities

Faculty and their research interests:



Dr. Avijit Goswami, PhD (Heidelberg University, Germany)
Research Interests: Synthetic organic and polymer chemistry



Dr. Debaprasad Mandal, PhD (IIT Kanpur)
Research Interests: Organic and organometallic chemistry



Dr. T. J. Dhilip Kumar, PhD (IIT Madras)
Research Interests: Electronic structure calculations, chemical kinetics and reaction dynamics



Dr. Nagaraja Mallaiah, PhD (IISc, Bangalore)
Research Interests: Inorganic, organometallic and materials chemistry



Dr. Narinder Singh, PhD (GNDU, Amritsar)
(Coordinator of the Department)
Research Interests: Nano-particles, calix[4]arene and tripodal frameworks for chemo-sensor development



Dr. Prabal Banerjee, PhD (NCL, Pune)
Research Interests: Synthetic organic chemistry



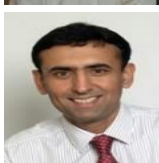
Dr. Rajendra Srivastava, PhD (NCL, Pune)
Research Interests: The design, synthesis and catalytic investigation of functional nanoporous materials and ionic liquids



Dr. Tharamani C.N., PhD (Bangalore University, Bangalore)
Research Interests: Electrochemistry, fuel cells, nanostructured materials, electrocatalysis, metal finishing



Dr. Yashveer Singh, PhD (University of Allahabad, Allahabad)
Research Interests: Polymeric biomaterials for targeted drug delivery; bioconjugate chemistry (siRNAs/aptamers, peptides/proteins, PEGs); and noninvasive optical imaging, with emphasis on HIV-1 prevention and cancer treatment



Prof. Jas Pal S. Badyal (Visiting Professor), PhD, Cambridge University, UK
Research Interests: Functional surfaces, surface science, bioinspired materials, heterogeneous catalysis, solar harvesting, water collection and purification

INSPIRE faculty



Dr. Vimal K. Bharadwaj, PhD (GNDU, Amritsar)

Research Interests: Bioinorganic chemistry and crystallography

PhD students / Research associates / Postdoctoral and project fellows

Dr. Anuj kumar (Research associate): Synthesis and catalytic applications of nanoporous π -conjugated polymer-silica nanocomposite materials

Dr. Tilak Raj (Postdoctoral fellow): One pot organic synthesis of receptors for potential biological activities

Ms. Aarti Tiwari (PhD student): Presently doing course work

Mr. Amanpreet Singh (PhD student): Presently doing course work

Ms. Anju Joshi (PhD student): Presently doing course work

Mr. Anu Prathap M.U. (PhD student): Synthesis of nanostructured polyaniline and metal oxide for sensing applications

Mr. Ashok Kumar Pandey (PhD student): Development of [3+3]-cycloaddition of azomethine ylide towards the construction of piperidine ring system: application to the alkaloids synthesis

Mr. Asit Ghosh (PhD student): Presently doing course work

Ms. Balwinder Kaur (PhD student): Synthesis and applications of nanoporous metallosilicates.

Mr. Bharat Ugale (PhD student): Presently doing course work

Mr. Bhasker Sarmah (PhD student): Presently doing course work

Mr. S. N. Chavan (PhD student): Presently doing course work

Ms. Divya Goel: Project fellow

Mr. Divyendu Singh (PhD student): Presently doing course work

Mr. Hemant Sharma (PhD student): Design and synthesis of naphthalamide-based receptors for chemosensor and biological activity studies

Mr. Hrishikesh Chowdhury (PhD student): Presently doing course work

Ms. Kamal Malhotra (PhD student): Presently doing course work

Mr. Kamal Verma: Project fellow

Ms. Kamalpreet Kaur (PhD student): Design and synthesis of abiotic receptors for cation/anion recognition studies

Ms Madhu Samolia (PhD student): [Fundamental study of potential hydrogen storage materials](#)

Ms. Manjodh Kaur (PhD student): Presently doing course work

Mr. Nachiketa Chatterjee (PhD student): Presently doing course work

Ms. Poonam Rani: Project fellow

Ms. Preeti Saluja (PhD student): Design and synthesis of benzimidazole/benzthiazole-based receptors for chemosensor development

Mr. Rajkumar Kore (PhD student): Synthesis of ionic liquids for catalysis and zeolite synthesis

Ms. Rajwant Kaur (PhD student): [Completed course work, working on quantum dynamics of energy transfer processes in \$H^+ + CS\$ system](#)

Mr. Sinchan Maji (PhD student): Presently doing course work

Ms. Uma Kumari (PhD student): [Presently doing course work](#)

Alumni of the department

Dr. Rajni Ratti: Worked as a SRF (ext.) in [the](#) CSIR project, “Design and syntheses of a new class of salen-based metal complexes: A search for catalytic activity”

Dr. Ajnesh Singh: Worked as a RA in [the](#) CSIR project, “Design and synthesis of new ratiometric fluorescent chemo-sensors: Excited state proton transfer involving keto-enol tautomerism”

Laboratories

UG Lab

Chemistry [Practical Laboratory](#) (CYP100)

PG Labs

Cell Culture [Laboratory](#)

Electrochemistry Research [Laboratory](#)

Instrumental Methods of Analysis

Synthesis [Laboratory](#) - I

Synthesis [Laboratory](#) - II

Supramolecular Synthesis & Materials Chemistry Laboratory

Section B: Publications

2014

1. Fundamental studies of H₂ interaction with MAI₃ clusters [M = Li, Sc, Ti, Zr], Madhu Samolia, **T.J. Dhilip Kumar**, **J. Alloys Compd.** 2014, 588, 144-152
2. Exploration of selective recognition of iodide with dipodal sensor: 2,2'-[ethane-1,2-diylbis(iminoethane-1,1-diyl)]diphenol. Anil Kuwar, Kundan C Tayade, Judith C. Gallucci, Hemant Sharma, Sanjay B. Attarde, Rahul D. Patil and **Narinder Singh**; **Dalton Trans.**, 2014, Accepted Manuscript
3. Imine-Linked Chemosensors for the Estimation of Zn²⁺ in Biological Samples; Preeti Saluja, **Vimal K. Bhardwaj**, T. Pandiyan, Simanpreet Kaur, Navneet Kaur and **Narinder Singh**; **RSC Adv.**, 2014, Accepted Manuscript
4. Nanoaggregates of Benzothiazole-Based Amidine-Coupled Chemosensors: A Chemosensor for Ag⁺ and the Resultant Complex as a Secondary Sensor for Cl⁻; Tilak Raj, Preeti Saluja, **Narinder Singh** and Doo Ok Jang; **RSC Adv.** 2014, Accepted Manuscript
5. Al³⁺ selective colorimetric and fluorescent red shifting chemosensor: Application in living cell imaging. Anil Kuwar, Anuradha Moirangthem, Ray Jay Butcher, **Narinder Singh**, Anupam Basu, Kundan C Tayade, Umesh A Fegade, Dilip Govind Hundiwale and Rahul D. Patil; **Dalton Trans.**, 2014, Accepted Manuscript
6. Azo dye coupled imine linked dipodal chemosensor: Anion recognition with counter anion displacement assay; Kamalpreet Kaur, Ajnesh Singh, **Narinder Singh**; **Sensors and Actuators B: Chemical**, 2014, 191, 734-740
7. A novel urea-linked dipodal naphthalene-based fluorescent sensor for Hg(II) and its application in live cell imaging; Kundan Tayade, Banashree Bondhopadhyay, Anupam Basu, G. Krishna Chaitanya, Suban K. Sahoo, **Narinder Singh**, Sanjay Attarde, Anil Kuwar; **Talanta**, 2014, Accepted Manuscript
8. Nanoparticle-based, organic receptor coupled fluorescent chemosensors for the determination of phosphate; Navneet Kaur, Simanpreet Kaur, Amanpreet Kaur, Preeti Saluja, Hemant Sharma, Anu Saini, Nisha Dhariwal, Ajnesh Singh, **Narinder Singh**; **Journal of Luminescence**, 2014, 145, 175-179

9. Highly selective and sensitive receptor for Fe³⁺ probing; Umesh Fegade, Ajnesh Singh, G. Krishna Chaitanya, **Narinder Singh**, Sanjay Attarde, Anil Kuwar; **Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy**, 2014, 121, 569-574
10. Spiro- and Bicycloannulation of Sulfoximine-Substituted 2-Hydroxy-dihydropyrans: Enantioselective Synthesis of Spiroketal, Spiroethers, and Oxabicycles and Structure of Dihydropyran Oxocarbenium Ions. Michal Lejkowski, **Prabal Banerjee**, Gerhard Raabe, Jan Runsink, Hans-Joachim Gais. *Eu. J. Org. Chem.* Article first published online: 21 NOV 2013, DOI: 10.1002/ejoc.201301461

#2013#

11. A first-principles study of hydrogen interaction and saturation on ScAl₃; Madhu Samolia, **T.J. Dhilip Kumar**, **J. Alloys Compd.**, 2013, 552, 457-462
12. Template-free synthesis of CdS microspheres composed of nanocrystals with a new sulphur source; **C.M. Nagaraja**, Manjod Kaur, **Matt. Letters**, 2013, 111, 230-233 (check abbreviation)
13. Fluorescent Organic Nanoparticles of Biginelli-Based Molecules: Recognition of Hg²⁺ and Cl⁻ in an Aqueous Medium; Ajnesh Singh, Tilak Raj, Thammarat Aree, and **Narinder Singh**, **Inorg. Chem.** 2013, 52, 13830-13832
14. ZnO-Based Imine-Linked Coupled Biocompatible Chemosensor for Nano-molar detection of Co(II), Hemant Sharma, Ajnesh Singh, Navneet Kaur, **Narinder Singh**, **ACS Sustainable Chem. Eng.**, 2013, 1, 1600-1608
15. Fluorescent Organic Nanoparticles (FONs) of Rhodamine Appended Dipodal Derivative: Highly Sensitive Fluorescent Sensor for Detection of Hg(II) in Aqueous Media, **Vimal K. Bhardwaj**, Hemant Sharma, Navneet Kaur, **Narinder Singh**, **New J. Chem.**, 2013, Accepted Manuscript
16. An amide based dipodal Zn(II) complex: nano-molar detection of HSO₄⁻ in a semi-aqueous system, Umesh Fegade, Hemant Sharma, Kundan Tayade, Sanjay Attarde, **Narinder Singh**, Anil Kuwar, **Org. Biomol. Chem.**, 2013, 11, 6824-6828
17. Pyridyl- and benzimidazole-based ruthenium(III) complex for selective chloride recognition through fluorescence spectroscopy, Hemant Sharma, Hernández J. Guadalupe, Jayanthi Narayanan, Herbert Hofeld, Thangarasu Pandiyan, **Narinder Singh**, **Anal. Methods**, 2013, 5, 3880-3887
18. A counterion displacement assay with a Biginelli product: a ratiometric sensor for Hg(II) and the resultant complex as a sensor for Cl⁻, Amanpreet Kaur, Hemant Sharma, Simanpreet Kaur, **Narinder Singh**, Navneet Kaur, **RSC Adv.**, 2013, 3, 6160-6166
19. Nanomolar fluorogenic recognition of Cu(II) in aqueous medium: A highly selective “on-off”

- probe based on mesitylene derivative, Sanyog Sharma, Maninder Singh Hundal, **Narinder Singh**, Geeta Hundal, **Sensors and Actuators B: Chemical**, 2013, 188, 590-596
20. A benzimidazole-based Co^{3+} complex for electrochemical and spectroscopic recognition of I^- and in semi-aqueous media, Hemant Sharma, **Vimal K. Bhardwaj**, Navneet Kaur, **Narinder Singh**, Doo Ok Jang, **Tetrahedron Letters**, Available online 27 August 2013
 21. Benzimidazole-based chromogenic chemosensor for the recognition of oxalic acid via counter ion displacement assay in semi-aqueous medium, Preeti Saluja, Navneet Kaur, Jongmin Kang, **Narinder Singh**, Doo Ok Jang, **Tetrahedron**, 2013, 69, 9001-9006
 22. Benzthiazole-based multifunctional chemosensor: fluorescent recognition of Fe(III) and chromogenic recognition of HSO_4^- , **Vimal K. Bhardwaj**, Preeti Saluja, Geeta Hundal, M.S. Hundal, **Narinder Singh**, Doo Ok Jang, **Tetrahedron**, 2013, 69, 1606-1610
 23. Unusual transformation of Substituted-3-Formylchromones to Pyrimidine Analogues: Synthesis and Antimicrobial Activities of 5-(o-hydroxyaroyl)pyrimidines, Tilak Raj, **Narinder Singh**, M.P.S. Ishar, **Bioorganic & Medicinal Chemistry Letters**, Available online 17 September 2013
 24. Differential recognition of anions with ZnO based urea-coupled sensors, Simanpreet Kaur, **Vimal K. Bharadwaj**, Amanpreet Kaur, **Narinder Singh**, Navneet Kaur, **Materials Letters**, 2013, 107, 154-157.
 25. Fluorescent primary sensor for zinc and resultant complex as secondary sensor towards phosphorylated biomolecules: INHIBIT logic gate, Kamalpreet Kaur, **Vimal K. Bhardwaj**, Navneet Kaur, **Narinder Singh**, **Inorganica Chimica Acta**, 2013, 399, 1-5
 26. L-cysteine recognition triggered by Zn(II) complexation with ligand, Min Joung Kim, Hemant Sharma, **Narinder Singh**, Doo Ok Jang, **Inorganic Chem. Commun.** 2013, 36, 96-99
 27. Synthesis and deposition of Ni-20Cr powder using cold spraying, Manoj Kumar, Harpreet Singh, **Narinder Singh**, **Surface Engineering**, 2013, 29, 419-426
 28. Study of Ni-20Cr Coatings for High Temperature Applications – A Review, Manoj Kumar, Harpreet Singh, **Narinder Singh**, **Archives of Metallurgy and Materials**, 2013, 58, 523-528
 29. Extraction and transport behaviour of tripodal receptor: selective recovery of Ni(II) and processing into nickel nanoparticles, Manoj Kumar, **Narinder Singh**, Harpreet Singh, **Mineral Processing and Extractive Metallurgy**, 2013, 122, 36-41
 30. A Much-Needed Mechanism and Reaction Rate for the Oxidation of Phenols with ClO_2 : A Joint Experimental and Computational Study, Carlos Alberto Huerta Aguilar, Jayanthi Narayanan, Mariappan Manoharan, **Narinder Singh** and Pandiyam Thangarasu, **Australian Journal of Chemistry**, 2013, 66, 814-824
 31. Design and Synthesis of a Pyridine Based Chemosensor: Highly Selective Fluorescent Probe For Pb(II) , Kundan C. Tayade, Anil S. Kuwar, Umesh A. Fegade, Hemant Sharma, **Narinder Singh**,

- Umesh D. Patil, Sanjay B. Attarde; **Journal of Fluorescence**, 2013 (In Press)
32. Urea Based Dipodal Fluorescence Receptor for Sensing of Fe³⁺ Ion in Semi-Aqueous Medium; Umesh Fegade, Hemant Sharma, Sanjay Attarde, Narinder Singh, Anil Kuwar; **Journal of Fluorescence**, 2013 (In Press)
 33. Highly efficient nanocrystalline zirconosilicate catalysts for the aminolysis, alcoholysis, and hydroamination reactions; Rajkumar Kore, **Rajendra Srivastava**, and Biswarup Satpati; **ACS Catalysis** 2013, 12, 2891-2904
 34. Simultaneous detection of guanine, adenine, thymine, and cytosine at polyaniline/MnO₂ modified electrode; Anu Prathap M.U., **Rajendra Srivastava**, and Biswarup Satpati; **Electrochimica Acta** 2013, 114, 285-295
 35. Facile preparation of Ni(OH)₂-MnO₂ hybrid material and its application in the electrocatalytic oxidation of hydrazine; M.U. Anu Prathap, V. Anuraj, Biswarup Satpati, **Rajendra Srivastava**; **Journal of Hazardous Materials** 2013, 262, 766-774
 36. Transition-Metal-Exchanged Nanocrystalline ZSM-5 and Metal-Oxide-Incorporated SBA-15 Catalyzed Reduction of Nitroaromatics; Balwinder Kaur, Mahesh Tumma, and **Rajendra Srivastava**; **Industrial and Engineering Chemistry Research** 2013, 52, 11479-11487
 37. Synthesis, structural and spectral properties of Au complexes: Luminescence properties and their non-covalent DNA binding studies; A. Huerta Carlos, J.M Talamantes Gómez, T. Pandiyan, I. Camacho-Arroyo, A. González-Arenas, N. Jayanthi, **Rajendra Srivastava**; **Applied Organometallic Chemistry** 2013 (In press)
 38. Synthesis of imidazole based NHC-Au(I) complexes and their application in non-enzymatic glucose sensing; Anu Prathap M.U., Carlos Alberto Huerta Aguilar, Thangarasu Pandiyan, and **Rajendra Srivastava**; **Journal of Applied Electrochemistry** 2013, 43, 939-951
 39. Electrochemical reduction of Lindane (γ -HCH) at NiCo₂O₄ modified electrode; M.U. Anu Prathap, **Rajendra Srivastava**; **Electrochimica Acta** 2013, 108, 145-152
 40. Facile preparation of polyaniline/MnO₂ nanofibers and its electrochemical application in the simultaneous determination of catechol, hydroquinone, and resorcinol; M.U. Anu Prathap, Biswarup Satpati, **Rajendra Srivastava**; **Sensors & Actuators: B. Chemical** 2013, 186, 66-77
 41. Simultaneous and sensitive determination of ascorbic acid, dopamine, uric acid, and tryptophan with silver nanoparticles-decorated reduced graphene oxide modified electrode; Balwinder Kaur, Thangarasu Pandiyan, Biswarup Satpati, **Rajendra Srivastava**; **Colloids and Surfaces B: Biointerfaces** 2013, 111, 97-106
 42. Synthesis of NiCo₂O₄ and its application in the electrocatalytic oxidation of methanol; M.U. Anu Prathap, **Rajendra Srivastava**; **Nano Energy** (Accepted April, 2013)
 43. Simultaneous determination of ascorbic acid, dopamine, uric acid, and tryptophan by

- nanocrystalline ZSM-5 modified electrodes; Balwinder Kaur, **Rajendra Srivastava**; **Journal of Nanoscience and Nanotechnology** (Accepted 11th April 2013)
44. A simple, eco-friendly, and recyclable bi-functional acidic ionic liquid catalysts for Beckmann rearrangement; Rajkumar Kore, **Rajendra Srivastava**; **Journal of Molecular Catalysis A: Chemical** 2013, 376, 90-97
 45. Transition metal nanoparticles supported on mesoporous polyaniline catalyzed reduction of nitroaromatics; Mahesh Tumma, **Rajendra Srivastava**; **Catalysis Communications** 2013, 37, 64-68
 46. Synthesis of hierarchical Beta using piperidine based multi-ammonium surfactants; Rajkumar Kore, R. Sridharkrishna, and **Rajendra Srivastava**; **RSC Advances** 2013, 3, 1317-1322
 47. Tailoring properties of polyaniline for simultaneous determination of a quaternary mixture of ascorbic acid, dopamine, uric acid, and tryptophan; M.U. Anu Prathap, **Rajendra Srivastava**; **Sensors & Actuators: B. Chemical** 2013, 177, 239-250
 48. Cu nanoparticles supported mesoporous polyaniline and its applications towards non-enzymatic sensing of glucose and electrocatalytic oxidation of methanol; M.U. Anu Prathap, Thangarasu Pandiyan, **Rajendra Srivastava**; **Journal of Polymer Research** 2013, 20, 86
 49. One-pot synthesis of 3-substituted indole derivatives using moisture stable, reusable task specific ionic liquid catalysts; A. Ravindran, R. Kore, **R. Srivastava**; **Indian Journal of Chemistry: Section B** 2013, 52B, 129-135
 50. Synthesis and optical characterization of ZnO nanoparticles capped with 2-aminothiols S. B. Rana, **Vimal K. Bhardwaj**, S. Singh, A. Singh, N. Kaur, **Journal of Materials Science: Materials in Electronics**, 2013, 24, 20-26
 51. Novel monodisperse PEGtide dendrons: design, fabrication, and evaluation of mannose receptor-mediated macrophage targeting; Jieming Gao, Peiming Chen, **Yashveer Singh**, Xiaoping Zhang, Zoltan Szekely, Stanley Stein, Patrick J. Sinko, **Bioconjugate Chemistry**, 2013, 24, 1332-1344

#2012#

52. Low-energy rotational inelastic collisions of $H^+ + CO$ system, **T.J. Dhilip Kumar**, S. Kumar, **J. Chem. Phys.** 2012, 136, 044317
53. Pyrazine Bridged Dicobaloximes with Bis(thiophenyl)glyoxime and their Molecular Oxygen Insertion; G. Dutta, **D. Mandal**, B. D. Gupta; **J. Organomet. Chem.** 2012, 706-707, 30-36
54. Fluorescent chemosensor for Al^{3+} and resultant complex as a chemosensor for perchlorate anion: First molecular security keypad lock based on Al^{3+} and ClO_4^- inputs. Kamalpreet Kaur,

- Vimal K. Bhardwaj**, Navneet Kaur, **Narinder Singh**; **Inorganic Chemistry Communications**, 2012, 26, 31-36
55. Benzimidazole-based fluorescent sensors for Cr^{3+} and their resultant complexes for sensing HSO_4^- and F^- . Preeti Saluja, Navneet Kaur, **Narinder Singh**, Doo Ok Jang; **Tetrahedron**, 2012, 68, 8551-8556
56. Imine linked chemosensors coupled with ZnO: Fluorescent and chromogenic detection of Al^{3+} . Hemant Sharma, Karan Narang, **Narinder Singh**, Navneet Kaur; **Materials Letters**, 2012, 84, 104-106
57. Imine linked 1,8-naphthalimide: Chromogenic recognition of metal ions, density function theory and cytotoxic activity. Hemant Sharma, Navneet Kaur, **Narinder Singh**; **Inorganica Chimica Acta**, 2012, 391, 83-87
58. Imine coupled ZnO based fluorescent chemosensor for the simultaneous estimation of Al^{3+} and Cr^{3+} . Kamalpreet Kaur, Navneet Kaur, **Narinder Singh**; **Materials Letters**, 2012, 80, 78-80
59. Dipodal fluorescent chemosensor for Cu^{2+} and resultant complex as a chemosensor for iodide. Hanna Goh, Min Joung Kim, Preeti Saluja, **Narinder Singh**, Doo Ok Jang; **Tetrahedron Letters**, 2012, 53, 3900-3902
60. Benzimidazole-based receptor for Zn^{2+} recognition in a biological system: a chemosensor operated by retarding the excited state proton transfer. Min Joung Kim, Kamalpreet Kaur, **Narinder Singh**, Doo Ok Jang; **Tetrahedron**, 2012, 68, 5429-5433
61. A benzimidazole-based fluorescent sensor for Cu^{2+} and its complex with a phosphate anion formed through a Cu^{2+} displacement approach. Preeti Saluja, Navneet Kaur, **Narinder Singh**, Doo Ok Jang; **Tetrahedron Letters**, 2012, 53, 3292-3295
62. Surface decoration of ZnO nanoparticles: A new strategy to fine tune the recognition properties of imine linked receptor. Hemant Sharma, Navneet Kaur, Thangarasu Pandiyan, **Narinder Singh**; **Sensors and Actuators B: Chemical**, 2012, 166-167, 467-472
63. Imine linked fluorescent chemosensor for Al^{3+} and resultant complex as a chemosensor for HSO_4^- anion. Kamalpreet Kaur, **Vimal K. Bhardwaj**, Navneet Kaur, **Narinder Singh**; **Inorganic Chemistry Communications**, 2012, 18, 79-82
64. Benzimidazole-based imine-linked chemosensor: chromogenic sensor for Mg^{2+} and fluorescent sensor for Cr^{3+} . Preeti Saluja, Hemant Sharma, Navneet Kaur, **Narinder Singh**, Doo Ok Jang; **Tetrahedron**, 2012, 68, 2289-2293
65. Asymmetric Synthesis of Densely Functionalized Medium-Ring Carbocycles and Lactones through Modular Assembly and Ring-Closing Metathesis of Sulfoximine-Substituted Trienes and Dienynes” M. Lejkowski, **Prabal Banerjee**, S. Schüller, A. Münch, J. Runsink, C. Vermeeren, H. -J. Gais, **Chem. Eur. J.** 2012, 3529-3548

66. Synthesis of transition metal exchanged nanocrystalline ZSM-5 and their application in electrochemical oxidation of glucose and methanol; Balwinder Kaur, M.U. Anu Prathap, **Rajendra Srivastava**; **ChemPlusChem** 2012, 77, 1119-1127
67. Synthesis of zeolite Beta, MFI, and MTW using imidazole, piperidine, and pyridine based quaternary ammonium salts as structure directing agents; R. Kore, **R. Srivastava**; **RSC Advances** 2012, 2, 10072–10084 (Accepted 22 August 2012)
68. Influence of $-\text{SO}_3\text{H}$ functionalization (N- SO_3H or N-R- SO_3H , where R = alkyl/benzyl) on the activity of Brønsted acidic ionic liquids in the hydration reaction; R. Kore, **R. Srivastava**; **Tetrahedron Letters** 2012, 53, 3245–3249
69. Hydration of alkynes using Brønsted acidic ionic liquids in the absence of Nobel metal catalyst/ H_2SO_4 ; R. Kore, **T.J. Dhillip Kumar**, **R. Srivastava**; **Journal of Molecular Catalysis A: Chemical** 2012, 360, 61–70
70. Direct synthesis of metal Oxide incorporated mesoporous SBA-15 and their applications in non-enzymatic sensing of glucose; M.U. Anu Prathap, B. Kaur, **Rajendra Srivastava**; **Journal Colloid and Interface Science** 2012, 370, 144-154
71. Hydrothermal synthesis of CuO micro-/nanostructures and their applications in the oxidative degradation of methylene blue and non-enzymatic sensing of glucose/ H_2O_2 ; M.U. Anu Prathap, Balwinder Kaur, **Rajendra Srivastava**; **Journal Colloid and Interface Science** 2012, 381, 143-151
72. Syntheses and catalytic activities of homogenous and hierarchical ZSM-5 grafted Pd(II) dicarbene complex of imidazole based ionic liquids; Rajkumar Kore, Mahesh Tumma, **Rajendra Srivastava**; **Catalysis Today** 2012, 198, 189–196
73. Synthesis of mesostructured polyaniline using mixed surfactants, anionic sodium dodecylsulfate and non-ionic polymers and their applications in H_2O_2 and glucose sensing; M.U. Anu Prathap, Bhawana Thakur, Shilpa N. Sawant, **Rajendra Srivastava**; **Colloids and Surfaces B: Biointerfaces** 2012, 89, 108-116
74. Synthesis of triethoxysilane imidazolium based ionic liquids and their application in the preparation of mesoporous ZSM-5 Rajkumar Kore, Rajendra Srivastava; **Catalysis Communication** 2012, 18, 11-15
75. Influence of surface modification by 2-aminothiophenol on optoelectronics properties of ZnO nanoparticles. S. B. Rana, **Vimal K. Bhardwaj**, S. Singh, A. Singh, N. Kaur, **Journal of Experimental Nanoscience**, 2012 (In Press)

76. Chromogenic and Fluorescent Recognition of Iodide with a Benzimidazole-Based Tripodal Receptor. Doo Youn Lee, **Narinder Singh**, Min Joung Kim, Doo Ok Jang; **Organic Letters**, 2011, 13, 3024–3027
77. An azo dye-coupled tripodal chromogenic sensor for cyanide. Doo Youn Lee, **Narinder Singh**, Apuri Satyender, Doo Ok Jang; **Tetrahedron Letters**, 2011, 52, 6919-6922
78. A benzthiazole-based tripodal chemosensor for Ba²⁺ recognition under biological conditions. Preeti Saluja, Navneet Kaur, **Narinder Singh**, Doo Ok Jang; **Tetrahedron Letters**, 2011, 52, 6705-6708
79. A selective ATP chromogenic sensor for use in an indicator displacement assay. **Narinder Singh**, Doo Ok Jang; **Tetrahedron Letters**, 2011, 52, 5094-5097
80. Ratiometric and simultaneous estimation of Fe³⁺ and Cu²⁺ ions: 1,3,5-substituted triethylbenzene derivatives coupled with benzimidazole. Doo Youn Lee, **Narinder Singh**, Doo Ok Jang; **Tetrahedron Letters**, 2011, 52, 3886-3890
81. Tetrapodal receptors for selective fluorescent sensing of AMP: analyte-induced conformational restriction to persuade fluorescence enhancement. **Narinder Singh**, Doo Ok Jang; **Tetrahedron Letters**, 2011, 52, 2608-2610
82. New tripodal and dipodal colorimetric sensors for anions based on tris/bis-urea/thiourea moieties. **Vimal K. Bhardwaj**, Sanyog Sharma, **Narinder Singh**, Maninder Singh Hundal, Geeta Hundal; **Supramolecular Chemistry**, 2011, 23, 790-800
83. Fine tuning of a solvatochromic fluorophore for selective determination of Fe³⁺: A new type of benzimidazole-based anthracene-coupled receptor. Doo Youn Lee, **Narinder Singh**, Doo Ok Jang; **Tetrahedron Letters**, 2011, 52, 1368-1371
84. Synthesis of Dicationic Ionic Liquids and their Application in the preparation of Hierarchical Zeolite Beta; Rajkumar Kore, Biswarup Satpati, **Rajendra Srivastava**; **Chemistry – A European Journal**, 2011, 17, 14360-14365
85. Morphologically controlled synthesis of copper oxides and their catalytic applications in the synthesis of propargylamine and oxidative degradation of methylene blue; **Rajendra Srivastava**, Anu Prathap M. U., Rajkumar Kore; **Colloids and Surfaces A: Physicochem. Eng. Aspects** 2011, 392, 271–282
86. Synthesis and applications of novel imidazole and benzimidazole based sulfonic acid group functionalized Bronsted acidic ionic liquid catalysts; Raj Kumar Kore, **Rajendra Srivastava**; **Journal of Molecular Catalysis A: Chemical** 2011, 345, 117
87. Synthesis and applications of highly efficient, reusable, sulfonic acid group functionalized Brønsted acidic ionic liquid catalysts; Raj Kumar Kore, **Rajendra Srivastava**; **Catalysis Communications** 2011, 12, 1420-1424

88. Synthesis of nanoporous metal oxides through the self-assembly of phloroglucinol–formaldehyde resol and tri-block copolymer; M.U. Anu Prathap, **R. Srivastava**; **Journal Colloid and Interface Science** 2011, 358, 399-408
89. Morphological controlled synthesis of micro-/nano-polyaniline M.U. Anu Prathap, **R. Srivastava**; **Journal of Polymer Research** 2011, 18, 2455-2467

#2010#

90. Ratiometric fluorescent determination of Zn(II): a new class of tripodal receptor using mixed imine and amide linkages. Doo Youn Lee, **Narinder Singh**, Min Joung Kim, Doo Ok Jang; **Tetrahedron**, 2010, 66, 7965-7969
91. Single sensor for multiple analytes: chromogenic detection of Γ and fluorescent detection of Fe^{3+} . Hee Jung Jung, **Narinder Singh**, Doo Youn Lee, Doo Ok Jang; **Tetrahedron Letters**, 2010, 51, 3962-3965
92. A benzimidazole-based single molecular multianalyte fluorescent probe for the simultaneous analysis of Cu^{2+} and Fe^{3+} . Doo Youn Lee, **Narinder Singh**, Doo Ok Jang; **Tetrahedron Letters**, 2010, 51, 1103-1106
93. Eco-friendly and morphologically controlled synthesis of porous CeO_2 microstructure and its application in water purification; **Rajendra Srivastava**; **Journal Colloid and Interface Science** 2010, 348, 600-607
94. Assessment of the Catalytic Activities of Novel Brønsted Acidic Ionic Liquid Catalysts; **Rajendra Srivastava**; **Catalysis Letters**, 2010, 139, 17-25

Section C: Books/Book Chapters/Conferences

Book chapters

1. Homochiral Metal-Organic Frameworks (MOFs) for Asymmetric Catalysis” in: “Modern Aspects of Functional Materials” **C. M. Nagaraja**, published by International Journal of Science Research, 2013, pp. 17-28
2. Quantum Dot Sensors: Technology and Commercial Applications. Chapter 5: Quantum Dot Probes Based on Energy Transfer Mechanisms, John F. Callan, Bridgeen McCaughan, Colin Fowley, **Narinder Singh**, Navneet Kaur, and Suban Sahoo, Pan Stanford Publishing, 2013.
3. Nitrogen containing carbon materials and their applications in electrocatalysis, in: “New research on carbon materials”, Vasantha Kumar, G. R. **Tharamani**, **C. Nagaiah***, Nova Science Publishers, 400 Oser Avenue, Suite 1600 Hauppauge, NY 11788, USA, 2013, pp. 113-144

Conferences

1. **D. Mandal**, XV Organic Chemistry Conference: Organized by National Organic Symposium Trust (NOST) at Hotel Jaypee Palace and Convention Centre, Agra, India; October 2012
2. **D. Mandal**, “Highly nonpolar fluorinated environment towards catalyst recovery, and ion sensing”, *15th CRSI National Symposium and 7th CRSI-RSC Symposium*, Banaras Hindu University, Varanasi, India; February 2013
3. **T. J. Dhilip Kumar**, “Low energy rotational inelastic collisions of $H^+ + CO$ system”, Theoretical Chemistry Symposium (TCS-2012), IIT Guwahati, India, 18-21 Dec, 2012
4. M. Samolia and **T. J. Dhilip Kumar**, “A first-principles study of hydrogen interaction and saturation on MAI_3 ” Theoretical Chemistry Symposium (TCS-2012), IIT Guwahati, India, 18-21 Dec, 2012
5. **T. J. Dhilip Kumar**, “Non-adiabatic dynamics in $H^+ + CO$ system” International conference on electronic structure and dynamics of molecules and clusters (ESDMC-2013) IACS Kolkata, India, 19-21 Feb, 2013
6. M. Samolia and **T. J. Dhilip Kumar**, “A first-principles study of hydrogen interaction and saturation on MAI_3 clusters [M=Sc, Ti, Zr]” at 3rd Indo-German conference: Modeling chemical and biological reactivity, NIPER, Mohali, India, 26 Feb-1 Mar, 2013
7. Rajwant Kaur and **T. J. Dhilip Kumar** “Hydrogen interaction with titanium functionalized calixarenes. A computational study” at Current Trends in Theoretical Chemistry-2013, BARC, Mumbai, 26-28 Sep, 2013
8. M. Samolia and **T. J. Dhilip Kumar**, “A computational study of hydrogen storage in titanium functionalized Mg-BN-framework” at Current trends in Theoretical Chemistry – 2013”, BARC, Mumbai, India, 26-28 September, 2013
9. Deepika, **T.J. Dhilip Kumar**, Nitin Goel and Rakesh Kumar “Controlled edge formation for grapheme nanoribbons” at International E-Workshop on Computational Condensed Matter Physics and Materials Science (IWCCMP-2013), 27th-29th November, 2013, @ IIITM Gwalior
10. Deepika, **T.J. Dhilip Kumar** and Rakesh Kumar, “Energy controlled edge formation for grapheme nano ribbons” at 58th DAE Solid State Physics Symposium 2013, Thapar University, Patiala, Punjab, 17-21 December, 2013
11. **R. Srivastava**, Synthesis and applications of task specific ionic liquid catalysis, International conference on Room Temperature Ionic Liquids, Institute of Chemical Technology (ICT), Mumbai, 3 December, 2011

12. **R. Srivastava**, Synthesis of nanoporous metal oxides at 20th National symposium on Catalysis, IIT Madras, India, 19-22 December, 2010
13. **R. Srivastava** and Rajkumar Kore, Synthesis of nanocrystalline zeolite Beta using ionic liquids, 21st National Symposium on Catalysis, CSIR-IICT Hyderabad, 11-13 Feb, 2013
14. Rajkumar Kore and **Rajendra Srivastava**, “Synthesis of Brønsted acidic ionic liquids and their application in the hydration of alkynes in the absence of Nobel metal catalysts/H₂SO₄, 2nd International Indo German Symposium on Green Chemistry and Catalysis for Sustainable Development, Institute of Chemical Technology, Mumbai, India, 29-31 October, 2012
15. Rajkumar Kore, **R. Srivastava**, Synthesis of nanocrystalline zeolites Beta, MFI, and MTW using ionic liquids as structure directing agent, 2nd International Symposium on Green Chemistry (ISGC-2) Renewable carbon and Eco-Efficient Processes, La Rochelle, France, 21-24 May, 2013
16. Rajkumar Kore and **Rajendra Srivastava**, Synthesis and catalytic investigations of Brønsted acidic ionic liquid catalysts”, 21st National Symposium on Catalysis, CSIR-IICT Hyderabad, 11-13 Feb 2013
17. Rajkumar Kore and **Rajendra Srivastava**, Synthesis and applications of nanocrystalline zeolite Beta using di-cationic ionic liquid catalysts, International NanoSciTech-212 Conference, Panjab University, Chandigarh, India, 16-18 Feb, 2012
18. Rajkumar Kore and **Rajendra Srivastava**, Synthesis of ionic liquids and their applications in catalysis and zeolite Synthesis, Research Scholar’s Day, Anusandhan 2012, Indian Institute of Technology, Ropar, Punjab, India ~~date~~
19. Balwinder kaur and **Rajendra Srivastava**, Synthesis of metal oxide incorporated mesoporous silica materials, Research Scholar’s Day, Anusandhan 2012, Indian Institute of Technology, Ropar, Punjab, India, ~~date~~
20. Balwinder kaur and **Rajendra Srivastava**, Transition metal incorporated mesoporous silicates for electrochemical oxidation of physiologically important bio-molecules, 21st National Symposium on Catalysis, CSIR-IICT Hyderabad, 11-13 February, 2013
21. Anu Prahap M.U., and **Rajendra Srivastava**, Synthesis of mesostructured polyaniline using mixed surfactants, anionic sodium dodecylsulfate and non-ionic polymers and their applications in H₂O₂ and glucose sensing”. IIST Research Scholars’ Day, Indian Institute of Space Science and Technology, Trivandrum, Valiamala, Kerala 695547, 16-17 December, 2011
22. Anu prahap M. U. and **Rajendra Srivastava**, Nanostructured Polyaniline for H₂O₂ and Glucose sensing, International NanoSciTech-212 Conference, Panjab University, Chandigarh, India, ~~date~~

23. Anu prahap M. U. and **Rajendra Srivastava**, Enzymatic and non-enzymatic electrocatalytic oxidation of bio-molecules using mesoporous polyaniline, 21st National Symposium on Catalysis, CSIR-IICT Hyderabad, 11-13 Feb, 2013
24. **Vimal K. Bhardwaj**, Molecular security keypad lock based on Al³⁺ and ClO₄⁻ inputs, ICSD 2011, Innovation in Chemistry for Sustainable Development, Panjab University Chandigarh, 1-3 Dec, 2011
25. **Vimal K. Bhardwaj**, Fluorescent Chemosensor for Aluminium Ion and Its Resultant Complex for Perchlorate Anion: A Molecular Logic Gate, National Symposium on Chemistry in 21st Century, Guru Nanak Dev University, Amritsar, 23-24 Dec, 2011
26. **Vimal K. Bhardwaj**, National Symposium on Bionanotechnology, I.I.T. Mandi, HP, 1-2 June 2012
27. **Yashveer Singh**, Polymeric vaginal hydrogels and gp120 surface binding inhibitors to prevent HIV-1 infection, Asian Polymer Association International Conference on Polymers: Visions and Innovations, India Habitat Center, New Delhi, 19-21 February, 2014
28. **Tharamani C.N.**, Scanning electrochemical method for the local visualization of electrocatalytic activity of oxygen reduction reaction at NEST 2013, Electrochemical Society of India, Indian Institute of Science, Bangalore, 23-24th Aug, 2013

Section D: Activities conducted in the department

Expert Talks

1. [24 October 2013](#): Dr. Rajesh Sharma, Postdoctoral Fellow, Paul-Drude-Institut, Berlin, Germany. Title “Transport and lasing characteristics of terahertz quantum-cascade lasers”.
2. [03 October 2013](#): Dr. Potiapan Vairaprakash, Title “Synthesis and applications of 2,3-diarylpiperazines, metal organic complex arrays & biohybrid light harvesting architectures”.
3. [29 August 2013](#): Dr. Diptikanta Swain, Institute of Chemical Sciences, Rennes University, Rennes, France. Title “Structure-conduction correlation in layered oxide electrode and sulfate electrolyte: insight from diffraction and Raman spectroscopy”.
4. [09 May 2013](#): Dr. Parthasarathi Das, Principal Scientist, Medicinal Chemistry Division, Indian Institute of Integrative Medicine, CSIR, Jammu. Title “Understanding the mechanism of the unprecedented reactions for the development of metal-free transfer hydrogenation process and the synthesis of naphthodioxoles”.

5. [09 May 2013](#): Prof. Kamal K. Kapoor, Department of Chemistry, University of Jammu, Jammu. Title "Copper-promoted carbon-heteroatom cross-coupling reaction with boronic acids: An emerging synthetic tool for organic chemist".
6. [07 March 2013](#): Dr. Kalyan K. Sadhu, Postdoctoral Fellow, Institut de Science et d'Ingénierie Supramoléculaires Université de Strasbourg, France. Title "Development of fluorogenic bio-application based on supramolecular interactions".
7. [04 February 2013](#): Dr. Easwar Srinivasan, Assistant Professor, Department of Chemistry, Central University of Rajasthan, Ajmer. Title: "Rational design of onium-tagged prolines as organocatalysts for the asymmetric aldol reaction".
8. [09 January 2013](#): Dr. Syed Masood Husain, [Postdoctoral Fellow, University of Freiburg, Germany](#). Title: "The role of quinone-hydroquinone tautomers in biosynthesis of natural products"
9. [01 November 2012](#): Dr. Ashok Kumar Patel, Department of Biophysics, John Hopkins University, Baltimore, USA. Title: "Understanding structure of pyruvate kinase for an effective drug for cancers".
10. [03 October 2012](#): Dr. Ananya Debnath, Max Planck Institute for Polymer Research, Mainz, Germany. Title: "Multiscale modelling of processes involving biological macro and long chain molecules".
11. [24 September 2012](#): Dr. V. Ramanathan, Department of Physics, University of Stuttgart, Germany. Title: "Towards label-free tumour diagnostics using Raman microspectroscopy: identification of nucleic acid markers".
12. [12 September 2012](#): Dr. Sudip Chakraborty, Colorado State University, Colorado, [USA](#). Title: "Molecular modeling and simulation of complex systems: from biology to materials".
13. [31 August 2012](#): Prof. P. K. Das, Department of Inorganic and Physical Chemistry, Indian Institute of Science, Bangalore.
14. [08 August 2012](#): Dr. Mily Bhattacharya, DST Women Scientist, IISER Mohali, Mohali. Title: "Conformational excursions of proteins heading to nanoscale amyloid assembly".
15. [01 August 2012](#): Dr. Venkatakrishnan, P. (University of Alberta, Edmonton, Canada). Title: "Functional Organics via Covalent and Non-Covalent Approaches".
16. [09 July 2012](#): Dr. S. R. C. Vivekchand, Northwestern University, Illinois, USA. Title: "Adventures with nanomaterials and surface plasmons".
17. [18 June 2012](#): Dr. Santanu Karan, Polymer Materials Unit, National Institute for Materials Science (NIMS), Tsukuba, JAPAN. Title: "Ultrafast transport of organic solvents through carbon nanosheet membranes: viscous flow in 1 nm pore"

18. [30 May 2012](#): Dr. Sounak Roy, Catalysis Center for Energy Innovation, University of Delaware, USA. Title: "Efficient catalysts for NO_x abatement"
19. [16 May 2012](#): Dr. V. N. Sivanandam, University of Notre Dame, Indiana, USA. Title: "NMR applications to biomolecular structure and dynamics"
20. [02 May 2012](#): Dr. Phaneendrasai Karri, The Scripps Research Institute, San Diego, CA, USA. Title: "From carboxylic acids to artificial nucleic acids: molecular design and synthesis: towards a better understanding of fundamental organic and prebiotic chemistry".
21. [08 Mar 2012](#): Dr. Laxmidhar Rout, Technical University Munich, Germany. Title: "New reagents, methods, and strategies for organic synthesis"
22. [22 Feb 2012](#): Dr. Khushwinder Kaur, Panjab University, Chandigarh. Title: "Effect of additives on the microstructure and properties of reverse micelles".
23. [13 Feb 2012](#): Dr. Dibyendu Bhattacharya, Institute of Chemistry, Academia Sinica, Taipei, Taiwan. Title: "Panchromatic Ruthenium(II) sensitizers for highly efficient dye-sensitized solar cells"
24. [09 Feb 2012](#): Dr. G. Karunakaran Raghuraman, University of Pennsylvania, Philadelphia, USA. Title: "Grafting of polymer monolayers – a versatile approach to modify surface properties towards biocompatibility & superhydrophobicity"
25. [03 Feb 2012](#): Dr. Sakkarapalayam M. Mahalingam, Purdue University, USA. Title: Design and synthesis of small molecules for biological interest and ligand targeted therapy and imaging for cancer"
26. [01 Feb 2012](#): Dr. Apurba L. Koner, Department of Biochemistry, University of Oxford, UK. Title: "Non-covalent chemistry in a confined nanospace and its applications"
27. [04 Jan 2012](#): Dr. Dattatri K. Nagesha, Northwestern University, Boston, USA. Title: "Surface chemistry of nanomaterials for biomedical applications"
28. [03 Jan 2012](#): Dr. Ram Sagar Mishra, Department of Chemistry, University of Oxford, UK.
29. [26 July 2011](#): Prof. T. Pandiyan, Professor of Chemistry, Faculty of Chemistry, National Autonomous University of Mexico (UNAM). Title: "Ruthenium complexes and their properties in diverse applications"
30. [21 July 2011](#): Dr. Viruthachalam Thiagarajan, CEA, IBITECS, and CNRS URA 2096, Laboratoire de Photocatalyse et Biohydrogène, 91191 Gif-sur-Yvette, France. Title: "Photoenzymatic repair of UV-damaged DNA monitored by real-time sub-nanosecond transient absorption [spectroscopy](#)"
31. [20 June 2011](#): Dr. Anandarup Goswami, Postdoctoral Fellow, Department of Chemistry and Chemical Biology, Rutgers University, USA. "Lithium phenolates solvated by

tetrahydrofuran and 1,2-dimethoxyethane: structure determination using the method of continuous variation"

32. 23 September 2010: Dr. Sameer Sapra, Department of Chemistry, IIT Delhi. Title: "Semiconductor nanocrystals: application for the future"

Foreign Students Hosted

1. Hosted **Mr. Carlos Alberto Huerta Aguilar** at IIT Ropar under Indo-Mexican joint research project funded jointly by DST-CONACYT (9 Jul–8 Aug, 2011)
2. Hosted **Mr. Carlos Alberto Huerta Aguilar** at IIT Ropar under Indo-Mexican joint research project funded jointly by DST-CONACYT (3 Jul–2 Aug, 2013)

Foreign Faculty Hosted

3. Hosted **Prof. T. Pandiyan** at IIT Ropar under Indo-Mexican joint research project funded jointly by DST-CONACYT (9 Jul–8 Aug, 2011)
4. Hosted **Prof. D.O. Jang** at IIT Ropar under Indo-Korean joint research project funded jointly by DST-ROK (14-17 Feb, 2012)
5. Hosted **Prof. J. Kang** at IIT Ropar under Indo-Korean joint research project funded jointly by DST-ROK (14-17 Feb, 2012)
6. Hosted **Prof. T. Pandiyan** at IIT Ropar under Indo-Mexican joint research project funded jointly by DST-CONACYT (4-24 July, 2013)
7. Hosted **Prof. D.O. Jang** at IIT Ropar under Indo-Korean joint research project funded jointly by DST-ROK (6-10 Feb, 2013)

Students of the Department Visited Abroad

1. **Ms. Rajwant Kaur**, PhD scholar, visited The University of Hong Kong for a workshop on research methodology organized by Imperial College London, UK, 14-21 July, 2013
2. **Mr. Hemant Sharma**, PhD scholar, received DST International Travel Grant to present his research work in 3rd International Conference on Nanotechnology: Fundamentals and Applications, Montreal, Quebec, Canada, 7-9 August 2012
3. **Dr. Ajnesh Singh & Mr. Hemant Sharma** visited the Department of Chemistry, Yonsei University, Wonju, S. Korea under Indo-Korean joint research project funded jointly by DST-ROK, 18th Feb-2nd March, 2013

4. **Mr. Rajkumar Kore**, PhD scholar, received DST International Travel Grant to present his research work in the 2nd International Symposium on Green Chemistry (ISGC-2) Renewable carbon and Eco-Efficient Processes, La Rochelle, France, 21-24 May, 2013

Section E: Activities of faculty:

Foreign Visits

1. **Dr. Narinder Singh** visited the Faculty of Chemistry, National Autonomous University of Mexico (UNAM) under the DST Indo-Mexican joint research project, 21st-30th July, 2012
2. **Dr. Narinder Singh** visited the Department of Chemistry, Yonsei university, Wonju, S. Korea under Indo-Korean joint research project funded jointly by DST-ROK, 1st-10th Jan, 2012
3. **Dr. Narinder Singh** visited the Faculty of Chemistry, National Autonomous University of Mexico (UNAM) under the DST Indo-Mexican joint research project, 19th November-6th December, 2013
4. **Dr. R. Srivastava** visited the Faculty of Chemistry, National Autonomous University of Mexico (UNAM) under the DST Indo-Mexican joint research project, 21st-30th July, 2012
5. **Dr. R. Srivastava** visited the Durham University, 15-17 July, 2012
6. **Dr. R. Srivastava** visited the Faculty of Chemistry, National Autonomous University of Mexico (UNAM) under the DST Indo-Mexican joint research project, 19th November-6th December, 2013
7. **Dr. Vimal Kumar** visited the Department of Chemistry, Yonsei University, Wonju, S. Korea under Indo-Korean joint research project funded jointly by DST-ROK, 1-10 Jan 2012

Talks/Invited Talks (In India): (~~order of years is not correct/uniform for NS~~)

1. **Invited Talk of Dr. T. J. Dhilip Kumar:** Low energy rotational inelastic collisions of H⁺ + CO system on Dec 18, 2012 at Theoretical Chemistry Symposium (TCS-2012), IIT Guwahati
2. **Invited Talk of Dr. Narinder Singh:** Nanoparticles as frameworks for chemosensor development, 17th July 2010 for Teacher Training Programme sponsored by Punjab Technical University at GGS College of Modern Technology, Kharar
3. **Invited Talk of Dr. Narinder Singh:** Benzimidazole-Based Receptor for Chemosensor Development, 28th Aug, 2010, UGC Sponsored National Seminar on "Importance of Solid/Solution State Techniques in Chemistry, Pt. Mohan Lal S. D. College (W), Gurdaspur
4. **Invited Talk of Dr. Narinder Singh:** Chemosensors for Environmental Analysis, 16th Nov, 2010, Science Congress at Jawahar Navodaya Vidyalaya, Sandhuian, Ropar

5. **Invited Talk of Dr. Narinder Singh:** Surface modification of CdSe/ZnS nanoparticles for chemosensor development, 12th Feb, 2011, Prof. Ram Chand Paul International Conference on Emerging Trends in Chemistry, Panjab University, Chandigarh
6. **Invited Talk of Dr. Narinder Singh:** Recent advances in chemosensor development, 10th March 2012, Khalsa College, Jalandhar (UGC Sponsored Seminar)
7. **Invited Talk of Dr. Narinder Singh:** Ionic Liquid based Chemosensors, 25th Feb, 2012, SGGS, Khalsa College, Mahilpur (UGC Sponsored Seminar)
8. **Invited Talk of Dr. Narinder Singh:** Design & synthesis of new receptors for chemosensor development. 1st& 2nd June, 2012, IIT Mandi (National Symposium on Bionanotechnology)
9. **Invited Talk of Dr. Narinder Singh:** Role of supramolecular chemistry in engineering applications, 19th Sep 2013, Chandigarh University
10. **Invited Talk of Dr. Narinder Singh:** Recent developments in supramolecular chemistry, 11th Oct 2013, Mata Gujri College, Fatehgarh Sahib
11. **Invited Talk of Dr. Narinder Singh:** Chemosensor development: Fluorescent organic nanoparticles and organic-inorganic hybrid nanoparticles; 31st Oct, 2013 at International conference on interdisciplinary areas with chemical sciences held at INST Mohali, Panjab University, Chandigarh
12. **Invited Talk of Dr. R. Srivastava:** Synthesis and applications of task specific ionic liquid catalysis at the Theme Meeting on "Room Temperature Ionic Liquids"; 3 December, 2011, Institute of Chemical Technology (ICT), Mumbai
13. **Invited Talk of Dr. R. Srivastava:** Green Chemistry, 17 November, 2010, "Science Congress", Jawahar Navodaya Vidyalaya, Sandhuan, Roopnagar, Punjab
14. **Invited Talk of Dr. R. Srivastava:** Synthesis of nanoporous metal oxides, 19-22 December, 2010, 20th National symposium on Catalysis, IIT Madras, Chennai
15. **Invited Talk of Dr. R. Srivastava:** Hierarchical/Nanocrystalline zeolite: A new concept in zeolite chemistry, 10th May 2013, Golden Jubilee celebration of MNIT Jaipur, MNIT Jaipur
16. **Invited Talk of Dr. R. Srivastava:** Mesoporous zeolites, a new concept in nanoporous material: Fundamental approach to insert mesoporosity in zeolite microcrystal and its application in industrial research, 8th November 2013, INST Mohali
17. **Invited Talk of Dr. Tharamani C.N:** Electrochemistry and chemical kinetics, 4th October, year, VIBE, Rayat International School, Rupnagar, Punjab
18. **Invited Talk of Dr. Tharamani C.N:** Design of Active Catalysts for Tomorrow's Energy Claim, 6 December, 2013, 50th Annual Convention of Chemists, Indian Chemical Society, Department of Chemistry, Panjab University, Chandigarh

19. **Invited Talk of Dr. Tharamani C.N:** Science & Research, 24th-29th December 2013, Sree Siddaganga College of Arts, Science and Commerce for Women, Tumkur, INSPIRE Internship Science Camp organised by DST India
20. **Invited Talk of Dr. Vimal K. Bhardwaj:** Concepts of Environment science and technology, 12 Mar, 2013, Nishan Academy, Aulakh, Mukatsar
21. **Invited Talk of Yashveer Singh:** Design, development, and evaluation of PEG-based biomaterials for targeted drug delivery, 6 December 2013, 50th Annual Convention of Chemists, Indian Chemical Society, Department of Chemistry, Panjab University, Chandigarh
22. **Invited Talk of Yashveer Singh,** Emerging trends in biomedical nanotechnology, 20 August 2013, Department of Applied Sciences and Humanities, RIMT – Institute of Engineering and Technology, Mandi Gobindgarh

Talks/Invited Talks (Abroad)

1. **Talk of Dr. Narinder Singh:** New trends and mechanism for fluorescent chemosensors, 26th June 2012, UNAM Mexico
2. **Talk of Dr. Narinder Singh:** Benzimidazole: A new class of cation and anion chemosensors, 6th Jan 2012, Yonsei University, Wonju, S. Korea
3. **Talk of Dr. Narinder Singh:** Aggregate-Induced Fluorescence Emission, 2nd Dec, 2013, UNAM, Mexico
4. **Talk of R. Srivastava:** Mesoporous zeolites a new concept in nanoporous material, 27th November 2013, UNAM, Mexico

Session Chaired

1. **Dr. Prabal Banerjee,** Chaired a session of a two day symposium entitled ‘Organic Chemistry Frontier’, CBMR, Luknow, 5-6th July, 2013

Section F: Awards, Honours, Recognitions

PG Students

Anu Prathap M. U. and Rajkumar Kore were selected for CSIR-SRF fellowship

Faculty

Dr. Tharamani C.N. has been awarded the **Ramanujan fellowship** by Department of Science and Technology, India

Dr. Vimal Kumar has been selected for DST-INSPIRE Faculty Award 2011

Section G: Research Projects

S. No.	Name of the Funding Agency	Project Title	Total Funding (Approx.)
1.	CSIR, India	Design and synthesis of new ratiometric fluorescent chemo-sensors: excited state proton transfer involving keto-enol tautomerism (2011-14) (PI: Dr. Narinder Singh)	18 lacs
2.	CSIR, India	Design and syntheses of a new class of salen based metal complexes: a search for catalytic activity (2011-14) (PI: Dr. Avijit Goswami & Co-I: Dr. Narinder Singh)	18. lacs
3.	India-Korean Joint Project (DST-ROK)	Design and synthesis of quantum dot-based benzimidazole-coupled chemosensors (2011-14) (PI: Dr. Narinder Singh)	Exchange visits
4.	ISIRD grant, IIT Ropar	Synthesis and recognition properties of new tripodal and tetrapodal framework (Completed) (PI: Dr. Narinder Singh)	7.5 lacs
5.	DST, India	Surface engineering to control erosion-corrosion of steam generating plants by nano-particle coatings (Completed) (PI: Dr. Harpreet Singh, SMME & Co-I: Dr. Narinder Singh)	42 lacs

6.	India-Mexico Project (DST-CONACYT)	Joint	Synthesis of Au(I) complexes luminescent based benzimidazole, pyridyl and amine: Gold nano-particles for sensor development (2012-15) (PI: Dr. Narinder Singh & Co-I: Dr. R. Srivastava)	Exchange visits
7.	DST, India		Synthesis and catalytic applications of hierarchical/nanocrystalline zeolite catalysts (Completed) (PI: Dr. R. Srivastava)	33.5 lacs
8.	ISIRD grant, IIT Ropar		Synthesis of di-cationic & amino acid derived ionic liquid and their application in catalysis and materials synthesis (Completed) (PI: Dr. R. Srivastava)	8.0 lacs
9.	CSIR, India		Synthesis and catalytic applications of nanoporous π -conjugated polymer-silica nanocomposite materials (2011-14) (PI: Dr. R. Srivastava)	20 lacs
10.	DST, India		Synthesis and catalytic applications of crystalline mesoporous materials prepared using hierarchical agents (2013-17) (PI: Dr. R. Srivastava)	33 lacs
11.	ISIRD grant, IIT Ropar		Fuel cell materials for renewable energy: theoretical studies on hybrid nanomaterials (PI: Dr. T. J. Dhilip Kumar)	9.8 lacs
12.	DST, India		H ₂ storage and fuel cell materials for renewable energy: Fundamental study on metal hybrid nanostructures (2010-13) (PI: Dr. T. J. Dhilip Kumar)	13.2 lacs
13.	BRNS, India		Development of porous metal organic frameworks (MOFS) for H ₂ storage (2013-16) (PI: Dr. C. M. Nagaraja, and Co-I: Dr. T. J. Dhilip Kumar)	29 lacs
14.	ISIRD grant, IIT Ropar		Development of porous metal-organic framework materials for H ₂ storage and selective CO ₂ Capture (2012-14) (PI: C. M. Nagaraja)	36 lacs
15.	DST, India		Development of porous chiral metal-organic frameworks (CMOFs) for heterogeneous asymmetric catalysis (2012-15) (PI: C. M. Nagaraja)	23 lacs

16.	DST, India	Synthesis, characterization and investigation of comparative catalytic activities of transition metal complexes of mono, di, tri and tetrapodal Schiff bases and their reduced products (2012-2017) (PI: Dr. Vimal Kumar)	35 lacs
17.	DST, India	Development of [3+3]-cycloaddition of azomethine ylide towards the construction of piperidine ring System: application to the alkaloids synthesis (PI: Dr. P. Banerjee)	19 lacs
18.	ISIRD grant, IIT Ropar	Development and characterization of highly active cathode materials for polymer electrolyte membrane fuel cells (PI: Dr. Tharamani C.N.)	41 lacs
19.	CSIR, India	Development of novel transition metal complexes with pincer-type ligands for splitting of Water (2013-16) (PI: C. M. Nagaraja)	19 lacs
20.	BRNS-DAE, India	New archetype of ionic liquids and their applications in electrolytes and other systems (2014-2016) (PI: Dr. D. Mandal)	23.55 lacs
21.	DST, India	Fluorous approach towards anion recognition for overcoming the Hofmeister bias (2013-2015) (PI: Dr. D. Mandal)	25.5 lacs
22.	ISIRD grant, IIT Ropar	Design and development of Schiff base-based pH-sensitive degradable hydrogels for vaginal microbicide delivery (2013-2015) (PI: Dr. Yashveer Singh)	44 lacs

Section H: National and International Collaborations

1. **Dr. Narinder Singh & Dr. R. Srivastava** have established a collaboration with Prof. T. Pandiyan of National Autonomous University of Mexico (UNAM) through research project: Synthesis of Au(I) complexes luminescent based benzimidazole, pyridyl and amine: gold nano-particles for sensor development; Funding agency: DST- CONACYT (Indo-Mexico joint research project)
2. **Dr. Narinder Singh** have established a collaboration with Prof. D.O. Jang of Yonsei University, S. Korea through research project: Design and synthesis of quantum dot-based benzimidazole-coupled chemosensors; Funding agency: DST- ROK (Indo-Korea joint research project)

3. **Dr. Rajendra Srivastava** have established a collaboration with Prof. Jas Pal S. Badyal, Department of Chemistry, Durham University, Durham, England (Joint project submitted)

Section I: Details of Courses and Teaching Activities

UG courses

Core

1. CYL101 Structure, Reactivity and Dynamics 4 (3-1-0)
2. CYP100 Chemistry Laboratory 2 (0-0-4)
3. CYL250 Environmental Science and Engineering 3 (3-0-0)

Electives

4. CYL200 Synthesis and Catalysis 4 (3-1-0)
5. CYL210 Materials Chemistry 4 (3-1-0)□□
6. CYL220 Polymers and Soft Materials 4 (3-1-0)□□
7. CYL230 Theoretical Chemistry 4 (3-1-0)□□
8. CYL300 Measuring Molecules 4 (3-1-0)
9. CYL456 Chemistry of Life – An Introduction 4 (3-1-0)□□
10. CYL458 Biomaterials 4 (3-1-0)
11. CYL551 Biomedical Nanotechnology

PG courses

Core

1. CYL701 Molecular Spectroscopy, (3-0-0)

Electives

2. CYL601 Concepts of Physical Chemistry (3-0-0)
3. CYL602 Concepts of Organic Chemistry (3-0-0)
4. CYL603 Concepts of Inorganic Chemistry (3-0-0)
5. CYL604 Electronic Structure Calculations (2-0-2)
6. CYL605 Quantum Molecular Reaction Dynamics (3-0-0)
7. CYL611 Advances in Catalysis (3-0-0)
8. CYL612 Molecular Recognition (3-0-0)
9. CYL613 The Chemistry of Metal Carbon Bond (3-0-0)
10. CYL614 Principles of Biochemistry (3-0-0)

11. CYL702 Chemistry of Novel Heterogeneous Catalytic Materials (3-0-0)
12. CYL703 Strategies in Supramolecular Chemistry (3-0-0)
13. CYL704 Chemical Synthetic Strategy of Organic Reactions (3-0-0)
14. CYL705 Bioconjugates: Techniques and Applications (3-0-0)

Section J: Membership of Professional Societies

- Dr. D. Mandal:** American Chemical Society (ACS)
- Dr. D. Mandal:** Chemical Research Society of India (CRSI)
- Dr. T.J. Dhillip Kumar:** American Chemical Society (ACS)
- Dr. T.J. Dhillip Kumar:** Chemical Research Society of India (CRSI)
- Dr. C.M. Nagaraja:** American Chemical Society (ACS)
- Dr. C.M. Nagaraja:** Life member, Chemical Research Society of India (CRSI)
- Dr. P. Banerjee:** Chemical Research Society of India (CRSI)
- Dr. R. Srivastava:** Life member, Catalysis society of India
- Dr. R. Srivastava:** Life member, Chemical Research Society of India
- Dr. Tharamani C.N.** The Electrochemical Society USA (ECS)
- Dr. Tharamani C.N.** International Society of Electrochemistry (ISE)
- Dr. Tharamani C.N.** Electrochemical Society of India (ECSI)
- Dr. Yashveer Singh:** American Chemical Society (ACS)
- Dr. Yashveer Singh:** American Association of Pharmaceutical Scientists (AAPS)

Section K: Contributions to improve quality of education in other institutions

Thesis supervised for other institutes

1. **Dr. Narinder Singh has supervised MTech thesis of Ms. Mary Candida Jacob** (National Institute of Technology Karnataka)

Title of Thesis: Design and synthesis of organic receptors for nanoparticle synthesis and metal complexation: A search towards sensors and biological activities (2012-13)

2. **Dr. Narinder Singh has supervised MTech thesis of Ms. Anu Saini** (Panjab University Chandigarh)

Title of Thesis: Synthesis and coupling of imine-linked receptors on silver nanoparticles for cation/anion recognition studies (2011-12)

3. Dr. Narinder Singh has supervised MTech thesis of Mr. Karan Narang (Panjab University, Chandigarh)

Title of Thesis: Surface decoration of ZnO nanoparticles for chemosensor development (2011-12)

4. Dr. Narinder Singh has supervised MTech thesis of Ms. Vandana (Panjab University, Chandigarh)

Title of Thesis: Design and synthesis of imine linked nanoparticles based chemosensors (2010-11)

5. Dr. Narinder Singh is supervising MTech thesis of Ms. Nidhi Arora (Panjab University, Chandigarh)

6. Dr. Rajendra Srivastava has supervised one year MTech thesis of Ms. Anaswara Ravindran registered for MTech programme at CUSAT, Cochin, Kerala (July 2010-May 2011), SEMESTER 1: Thesis title: Synthesis of indole derivatives using ionic liquid catalysts, SEMESTER 2: Synthesis of Indole/Naphthol derivatives via multi-component reaction using heterogeneous catalysts

7. Dr. Rajendra Srivastava has supervised one year MTech thesis of Mr. Anuraj V. registered for MTech programme at CUSAT, Cochin, Kerala (July 2012-May 2013), SEMESTER 1: Development of metal oxide based electrocatalyst for non-enzymatic hydrazine sensing, SEMESTER 2: Synthesis of transition mixed-metal oxides for catalysis.

8. Dr. Rajendra Srivastava is supervising one year MTech thesis of Mr. Martin P. Francis registered for MTech programme at CUSAT, Cochin, Kerala (July 2013 to Till date), SEMESTER 1: "Synthesis and Applications of Polyaniline-Transition Metal Oxide Composite Materials

9. Dr. Yashveer Singh is supervising MTech thesis of Ms Priya Verma, Center for Convergent Technologies, University of Rajasthan, Jaipur

Summer Training

1. Bhagyashree Date, ISNA-IAS, SRF worked with **Dr. T. J. Dhilip Kumar**; Title of the project: Sums and densities of states of vibrational modes (Regd. No. CHES971), May-July 2013

2. Aditya, MS student, IISER Mohali, worked with **Dr. T. J. Dhilip Kumar**; Title of the project: Effects of Sc, Ti, and Zr doping on catalytic activity of small Al clusters, December 2011

3. Sumit Mittal, MS student, IISER Mohali, worked with **Dr. T. J. Dhilip Kumar**; Title of the project: Theoretical study of $H^+ + 2Cl^+$ ion, May-July 2011

4. Mr. Deepinder Singh, IISc, Bangalore worked with **Dr. Narinder Singh**; Title of the project: Design and synthesis of dipodal receptors, 2013

5. Ms. Tanisha Sachdeva (Regd. No. CHES1354 of Summer Research Fellowship Programme jointly sponsored by the three national science academies of the country) worked with **Dr. Narinder**

Singh; Title of the project: Synthesis of benzimidazole and benzothiazole-based chemosensors for selective recognition of anions; 2013

6. **Ms. Shailja Data** (Regd. No.CHE1549 of Summer Research Fellowship Programme jointly sponsored by the three national science academies of the country) worked with **Dr. Narinder Singh**; Title of the project: Cobalt complex of benzimidazole and benzothiazole-based chemosensors for anion detection; 2013

7. **Mr. Gagandeep Singh**, IISc, Bangalore worked with **Dr. Narinder Singh**; Title of the project: Design and synthesis of tripodal receptors; 2013

8. **Mr. Kedarisetti Ravi**, IISc, Bangalore (Regd. No.CHE1391 of Summer Research Fellowship Programme jointly sponsored by the three national science academies of the country) worked with **Dr. Rajendra Srivastava**; Title of the project: Synthesis and catalytic application of mesoporous KIT-6 materials

9. **Ms. K. Madhuri** (Regd. No. CHES 996 of Summer Research Fellowship Programme) worked with **Dr. Tharamani C.N.**, Title of the project: Development and characterization of zinc oxide for gas sensor applications

10. **Mr. Sangram K. Mohanty** (Regd. No. CHES 825 of Summer Research Fellowship Programme) worked with **Dr. Tharamani C.N.**, Title of the project: Development and characterization of zinc Ni binary alloys

Other Tasks

1. The faculty members of the department have reviewed a large number of research manuscripts submitted to various peer reviewed journals of international repute
2. The faculty members of the department have reviewed PhD synopsis / PhD thesis / MTech thesis and served as external examiners for thesis defense examinations
3. **Dr. T.J. Dhilip Kumar** served as resource person for a session on 13 May 2013 in AICTE sponsored faculty development programme titled “Nanotechnology for sustainability: energy conversion and storage”, KSR College of Technology, Tiruchengode, India, 6-18 May, 2013
4. **Dr. Narinder Singh** served as a selection committee member for the appointment of scientists, NABI, Mohali
5. **Dr. Narinder Singh** served as a selection committee member for the appointment of research fellows, Panjab University SSGRC, Hoshiarpur
6. **Dr. Narinder Singh** served as a District Coordinator (for Rupnagar) for the examinations of Subordinate Services Selection Board of Punjab State, 24 October 2010

7. **Dr. Narinder Singh** serves as a Member, Board of Studies, Mata Gujri College, Fatehgarh Sahib
(An autonomous institute in Punjab state)

Section K: Plans for Future

1. Setting up of Central HPC facility
2. **Dr. Yashveer Singh** plans to initiate a research program focussed on the design, development, and evaluation of bioconjugates (siRNAs/aptamers, proteins/peptides, PEGs) to treat cancer, in particular lung cancer. His other plan is to establish a state-of-the-art tissue culture laboratory at IIT Ropar to carry out in vitro evaluation studies.
3. **Dr. Yashveer Singh** hosted **Prof. Jas Pal S. Badyal, Department of Chemistry, Durham University, Durham, England** on 26 September 2013 to explore the possibility of mutual collaboration in research and teaching between IIT Ropar and Durham University, UK

Section L: Major Research Facilities

1. Research Laboratories for PG students
2. State-of-the-art NMR facility
3. State-of-the-art single crystal X-ray diffractometer
4. Fluorescence spectrophotometer
5. UV-Vis spectrophotometer
6. IR spectrophotometer
7. Dynamic light scattering (DLS)-based particle size analyzer
8. Cyclic voltametry
9. BET
10. Semi-preparative HPLC system (Waters)
11. Gas Chromatography-Mass Spectrometry (**GC-MS**) (Model: Shimadzu QP 2010 Ultra)
12. Microwave Oven (Anton Paar; Multiwave PRO)
13. In-house cluster systems:
 - 4-node, 16-processor AMD Opteron rack servers
 - 2-node, 8-processor Intel Xeon rack servers
14. **MCR102 Modular Compact Rheometer** (Anton Paar) to measure the viscoelastic properties of biomaterials (hydrogels, gels, etc.)
15. **Sorvall ST 16 R refrigerated centrifuge** (Thermo Scientific) to carry out centrifugation at low temperatures. Suitable for clinical protocols, cell culture applications, and microplate processing

Any other detail, which is not covered above

1. Ms. Deepika, PhD scholar, Department of Physics, and working jointly with the chemistry department (Dr. T J Dhilip Kumar) has received Best Paper Award at International E-Workshop on Computational Condensed Matter Physics and Materials Science (IWCCMP-2013), @ IITM Gwalior with Co-authors Dr. T.J. Dhilip Kumar, and Dr. Rakesh Kumar, 27th-29th November, 2013
2. **Dr. T. J. Dhilip Kumar**, Participated in QS World University Rankings workshop organized by British Council and IIT Delhi on 15 November, 2013
3. **Dr. Yashveer Singh** served as an **editorial board member** and provided editorial service to the following journal: *Journal of Nanomedicine and Biotherapeutic Discovery*, OMICS Publications
4. **Dr. Yashveer Singh** published the following **editorial**: **Singh, Yashveer**; Systemic delivery remains a major challenge for oligonucleotide-based therapeutics? *Journal of Nanomedicine and Biotherapeutic Discovery* **2013**, 3(2), e124