Dr. Manish Kumar Mishra

Designation : Associate Professor

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Educational Qualifications

- M.Sc. (Organic Chemistry), PhD (Chemistry)

Academic Experience : 14 years

Research Area : Heterogeneous catalysis

Expertise:

Synthesis of nano-, mesoporous- and supported catalytic materials, Heterogeneous catalysis, Photocatalysis, Micellar catalysis, Green Chemistry

No. of Publication : 49

List of Publications

- **Publications**

1. Borrowing hydrogen activity of NH_2-MIL-125 for N-alkylation of amines with alcohols under solvent and base free condition, Nisha B. Patel, Naresh Vala, Atindra Shukla, Subhadip Neogi, Manish Kumar Mishra,* *Catalysis Communications* (2020) Accepted.

2. Catalytic activity of Mg-Al hydrotalcites and derived mixed oxides for imination reactions *via* oxidative-dehydrogenation mechanism, Naresh Vala, Pradyuman A. Joshi, **Manish Mishra**,* *New Journal of Chemistry* 44 (2020) 8859-8868.

3. Solid Acid Catalysts for Biodiesel Production, T. Parangi, **M.K. Mishra**,* *Comments on Inorganic Chemistry* 40 (2020) 176-216.

4. Micellar catalyzed hydroxylation of 1,2,3-trichloro-4,6-dinitrobenzene: Role of cationic head group–□ interaction, Ankita Ravani, Atindra Shukla, N.V. Sastry, Dinesh O. Shah, **Manish Kumar Mishra**,* *Journal of Molecular Liquids* 301 (2020) 112429.

5. Titania Nanoparticles as Modified Photocatalysts: A Review on Design and Development, T. Parangi, **M.K. Mishra**, *Comments on Inorganic Chemistry*, 39 (2019) 90-126.

6. Interaction of salicylic acid analogues with Pluronic® micelles: Investigations on micellar growth and morphological transition, V. Shah, B. Bharatiya, V. Patel, **M.K. Mishra**, A.D. Shukla, D.O. Shah, *Journal of Molecular Liquids* 277 (2019) 563-570.

7. Molecular insights into sodium dodecyl sulphate mediated control of size for silver nanoparticles, V. Shah, B. Bharatiya, **M.K. Mishra**, D. Ray, D.O. Shah, *Journal of Molecular Liquids* 273 (2019) 222-230.

8. Enhanced Photocatalytic Efficiency of a Least Active Ag−TiO_2 by Amine Adsorption, S.I. Mogal, D.O. Shah, T. Mukherjee, T. Shripathi, **Manish Kumar Mishra**,* *ACS Omega* 3 (2018) 12802−12812.

9. Study of Self and Cross Coupling Reaction of Amines to Imines Using MCM-41 and Al-20-MCM-41 Catalysts, Vivaksha Patel, Nirav Bhavsar, **Manish Mishra**, *Journal of Emerging Technologies and Innovative Research* 5 (2018) 777-782.

10. Zirconium triflate grafted on SBA-15 as highly efficient solid acid catalyst for ring opening of epoxides by amines and alcohols, Kamlesh N. Tayade, Lianyue Wang, Sensen Shang, Wen Dai, **Manish Mishra**, Shuang Gao, *Chinese Journal of Catalysis*, 38 (2017) 758–766.

11. Organobase catalysis using 1-(2-pyrimidyl) piperazine in micellar medium: An approach for better performance and reusability of organobase, Manu Vashishtha, **Manish Kumar Mishra**,* Dinesh O Shah, *Green Chemistry* 18 (2016) 1339–1354.

12. Methyloxonium triflate: An efficient catalyst for ring opening of epoxides with alcohols under ambient conditions, Geeta Devi Yadav, **Manish Kumar Mishra**, Surendra Singh, *Current Catalysis*, 4 (2015) 133-144.

13. Antimicrobial Activity of Supported Silver and Copper against E.coli in Water, P.B. Shukla1, **Manish Kumar Mishra**, Suresh Gyan Vihar University International Journal of Environment, Science and Technology, 1 (2015) 11-15.

14. Study on catalytic property of NaOH-cationic surfactant solutions for efficient, green and selective synthesis of flavanone, Manu Vashishtha, **Manish Mishra**,* Dinesh O. Shah, *Journal of Molecular Liquids*, 210 (2015) 151–159.

15. Synthesis of Aluminium Triflate Grafted MCM-41 as Water Tolerant-Acid Catalyst for Ketalization of Glycerol with Acetone, Kamlesh N. Tayade, **Manish Mishra**,* Munusamy K., Rajesh S. Somani, *Catalysis Science and Technology*, 5 (2015) 2427-2440.

16. Molecular mechanism of micellar catalysis of cross aldol reaction: Effect of surfactant chain length and surfactant concentration, Manu Vashishtha, **Manish Mishra**,* Sachin Undre, Man Singh, Dinesh O. Shah, *Journal of Molecular Catalysis A: Chemical* 396 (2015) 143-154.

17. A Study on Antimicrobial Activity of Silica Supported Copper Oxide against *Escherichia Coli*, Purvi B. Shukla, **Manish Mishra**,* Shailesh Dave, Monal shah, Mamta Purohit, International Journal of Frontier Science and Technology 2 (2014) 1-16.

18. Solvent free acid catalyzed direct N-Alkylation of amines with alcohols using Al grafted MCM-41, Kamlesh N. Tayade, **Manish Mishra**,* Munusamy K., Rajesh S. Somani, *Journal of Molecular Catalysis A: Chemical*, 390 (2014) 91-96.

19. Single step synthesis of silver doped titanium dioxide: Influence of silver on structural, textural and photocatalytic properties, Sajid I. Mogal, Vimal G. Gandhi, **Manish Mishra**,* Shilpa Tripathi, T. Shripathi, Pradyuman A. Joshi, Dinesh O. Shah, *Industrial & Engineering Chemistry Research*, 53 (2014) 5749-5758.

20. Silica supported copper, silver and iron for removal of E. coli from water, Purvi B. Shukla, **Manish Mishra**, *SGVU International Journal of Environment Science and Technology*, 2 (2014) 1-3.

21. Catalytic activity of MCM-41 and Al grafted MCM-41 for oxidative self and cross coupling of amines, Kamlesh N. Tayade, **Manish Mishra**,* *Journal of Molecular Catalysis A: Chemical*, 382 (2014) 114-125.

22. A novel approach for selective cross aldol condensation using reusable NaOH-cationic micellar systems, Manu Vashishtha, **Manish Mishra**,* Dinesh O. Shah, *Applied Catalysis A: General* 466 (2013) 38– 44.

23. Controlling Wettebility and hydrophobicity of Organo Clays Modified with Quaternary Ammonium Surfactants, Kinjal J Shah, **Manish Kumar Mishra**, Atindra Shukla, Toyoko Imae, Dinesh O Shah, *Journal of Colloid and Interface Scienc*e, 407 (2013) 493-499.

24. A study on factors influencing cross and self products selectivity in aldol condensation over propylsulfonic acid functionalized silica, Kamlesh N. Tayade, **Manish Mishra**,* *Catalysis Science and Technology*, 3 (2013) 1288-1300.

25. Clean borrowing hydrogen methodology using hydrotalcite supported copper catalyst, Manish Dixit, **Manish Mishra**,* P.A. Joshi, D.O. Shah, *Catalysis Communications*, 33 (2013) 80-83.

26. Physico-chemical and catalytic properties of Mg-Al hydrotalcite and Mg-Al mixed oxide supported copper catalysts, Manish Dixit, **Manish Mishra**,* P. A. Joshi, D. O. Shah, *Journal of Industrial and Engineering Chemistry*, 19 (2013) 458–468.

27. A Study on Deactivation and Regeneration of Titanium Dioxide during Photocatalytic Degradation of Phthalic Acid, Vimal G. Gandhi, **Manish Mishra**,* Pradyuman A. Joshi, *Journal of Industrial and Engineering Chemistry*, 18 (2012) 1902–1907.

28. Microwave assisted solvent free synthesis of α,ά-bis (arylidene) cycloalkanones by sulfated zirconia catalyzed cross aldol condensation of aromatic aldehydes and cycloalkanones, Kirat Rawal, **Manish Kumar Mishra**,* Manish Dixit, Meka Srinivasarao, *Journal of Industrial and Engineering Chemistry*, 18 (2012) 1474–1481.

29. Solvent Free N-heterocyclization of Primary Amines to N-substituted Azacyclopentanes using Hydrotalcite as Solid Base Catalyst, Manish Dixit, **Manish Mishra**,* P. A. Joshi and D. O. Shah, *Bulletin of Korean Chemical Society*, 33 (2012) 1457-1464.

30. Synthesis and characterization of novel aminopropylated fly ash catalyst and its beneficial application in base catalyzed Knoevenagel condensation reaction, D. Jain, **Manish Mishra**, A. Rani, *Fuel Processing Technology*, 95 (2012) 119–126.

31. Silica supported methanesulfonic acid: An efficient solid Brønsted acid catalyst for Pechmann reaction in the presence of higher *n*-alkanes, J. Joshi, **M.K. Mishra**,* M. Srinivasarao, *Canadian Journal of Chemistry*, 89 (6) (2011) 663-670.

32. Comparative study on nano-crystalline titanium dioxide catalyzed photocatalytic degradation of aromatic carboxylic acids in aqueous medium, V.G. Gandhi, **M.K. Mishra**, M.S. Rao, A. Kumar, D.O. Shah, P.A. Joshi, *Journal of Industrial and Engineering Chemistry*, 17 (2011) 331-339.

33. Synthesis and characterization of fly ash supported sulfated zirconia catalyst for benzylation reactions, C. Khatri, **M.K. Mishra**, A. Rani, *Fuel Processing Technology*, 91 (2010) 1288-1295.

34. Solvent free Synthesis of Acetyl Salicylic Acid over Nano-crystalline Sulfated Zirconia Solid Acid Catalyst, B. Tyagi, **M.K. Mishra**, R.V. Jasra, *Journal of Molecular Catalysis A: Chemical*, 317 (2010) 41-45.

35. Solvent free synthesis of 7-isopropyl-1,1-dimethyltetralin by the rearrangement of longifolene using nano-crystalline sulfated zirconia catalyst, B. Tyagi, **M.K. Mishra**, R.V. Jasra, *Journal of Molecular Catalysis A: Chemical*, 301 (2009) 67-78.

36. Microwave Assisted Solvent Free Synthesis of Hydroxy Derivatives of 4-Methyl Coumarin using Nano-crystalline Sulfated-Zirconia Catalyst, B. Tyagi, **M.K. Mishra**, R.V. Jasra, *Journal of Molecular Catalysis A: Chemical*, 286 (2008) 41-46.

37. Synthesis of 7-Substituted 4-Methyl Coumarins by Pechmann reaction using Nano-Crystalline Sulfated-Zirconia, B. Tyagi, **M.K. Mishra**, R.V. Jasra, *Journal of Molecular Catalysis A: Chemical* 276 (2007) 47–56.

38. Solvent free Isomerisation of Longifolene with Nano-Crystalline Sulfated- Zirconia, B. Tyagi, **M.K. Mishra**, R.V. Jasra, *Catalysis Communications***,** 7 (2006) 52–57.

39. Synthesis and Characterization of Nano-Crystalline Sulfated Zirconia by Sol-Gel method, **M.K. Mishra**, B. Tyagi, R.V. Jasra, *Journal of Molecular Catalysis A: Chemical,* 223 (2004) 61-65.

40. Effect of Synthetic Parameters on Structural, Textural, and Catalytic Properties of Nano-Crystalline Sulfated Zirconia Prepared by Sol-Gel Technique, **M.K. Mishra**, B. Tyagi, R.V. Jasra, *Industrial Engineering Chemistry Research*, 42 (2003) 5727-5736.

- **Book chapters**

1. Photocatalytic Degradation of Plastic Polymer: A Review, Tarun Parangi and **Manish Kumar Mishra**, in Reuse and Recycling of Materials: Solid Waste Management and Water Treatment, K.P. Jibin, Dr. Sabu Thomas, Dr Nandakumar Kalarikkal, Dr. Ange Nizhou (Ed.), River Publishers (2019) 225-250.

2. Photocatalytic Degradation of Alizarin Cyanine Green G, Reactive Red 195 and Reactive Black 5 using UV/TiO2 Process, Jaimin Vyas, **Manish Mishra**, Vimal Gandhi, *Materials Science Forum*, 764 (2013) 284-292.

3. Metal Doped Titanium Dioxide: Synthesis and Effect of Metal ions on Physico-chemical and Photocatalytic properties, Sajid I. Mogal, **Manish Mishra**,* Vimal G. Gandhi, Rajesh J. Tayade, *Materials Science Forum,* 734 (2013) 364-378, *Special topic volume on "Photocatalytic Materials & Surfaces for Environmental Cleanup-II"*.

4. Titanium dioxide catalyzed photocatalytic degradation of carboxylic acids from waste water, V.G. Gandhi, **M.K. Mishra**, P.A. Joshi, *Materials Science Forum 712 (2012) 175-189, Special topic volume on "Photocatalytic Materials & Surfaces for Environmental Cleanup"*.

- **Conference proceedings**

1. Study on the catalytic properties of silica supported copper catalysts, Manish Dixit, **Manish Mishra**, P.A. Joshi and D.O. Shah, *Procedia Engineering*, 51 (2013) 467-472; 3rd Nirma University International Conference on Engineering (NUiCONE 2012), organized by Nirma University, Gujarat, India, 6-8 December 2012.

2. Photocatalytic Degradation of organics in Aqueous Medium using Nano-crystalline Titania, V.G. Gandhi, **M.K. Mishra**, M.S. Rao, P.A. Joshi, National Conference on Applications of Nanotechnology, organized by Jodhpur Engineering College & Research Centre, (Jodhpur Engineering College & Research Centre, Jodhpur), 27- 29 Dec. 2007, Page No. 224-228.

- **Patents**

1. Catalytic Process for the Preparation of Isolongifolene, R.V. Jasra, B. Tyagi, **M.K. Mishra**, US Patent No.- US 7,132,582 B2 , Nov, 2006; Korea 0674626, Jan, 2007; India 195 683, April, 2006.

2. Green Catalytic Process for the Synthesis of Acetyl Salicylic acid, R.V. Jasra, B. Tyagi, **M.K. Mishra**, US Patent No.- 7544831, June, 2009; Patent Appl. Field for PCT and India.

3. Natural Mosquitoes Repellent Formulation, Joy S. Talati, **Manish Kumar Mishra**, Indian Patent Appl. No.: 201821001819, date of publication: 02/02/2018.

List of Minor/ Major projects carried out

Major projects

1. Study on multifunctional catalytic property of metal-organic frameworks (MOFs) catalysts for catalytic conversion of alcohols in industrially important synthesis reactions, Funded (30.98 lakh; 3½ years; September 2016 to March 2020) by SERB, DST, New Delhi.

2. Development of multifunctional catalysts for alcohol activation, Funded (Rs. 10.91 lakh; 3 years; September 2015 to July 2018) by University Grants Commission (UGC), New Delhi, under major research project.

3. Enhanced Oil Recovery using Nano materials, Funded (39.3 lakh; 2 years; March 2015) by Oil and Natural Gas Corporation (ONGC), Ahmedabad.

4. Development of efficient micellar media for green catalytic organic reactions, Funded (Rs. 4 lakh; 2 years; December 2014) by Gujarat Council on Science and Technology (GUJCOST), Department Of Science and Technology, Government of Gujarat, India, under minor research project.
5. A novel route for Synthesis of Silica supported Metal Sulfonates Solid Acid Catalysts and their Applications, Funded (Rs. 19.9 lakhs; 3 years; August 2010 to August 2013) by Department Of Science and Technology, SERC, New Delhi, India, under Fast Track Projects for Young Scientists.

6. Center of Excellence for Nanocatalysis: Development & Applications, Funded (Rs. 28 lakh; 3 years; April 2009 to March 2012) by Gujarat Council on Science and Technology (GUJCOST), Department Of Science and Technology, Government of Gujarat, India.

7. Removal of odor (VOCs) from polymers or paint formulation by adsorption, Funded (Rs. 13 lakh; 2 years; April 2014) by Asian Paints, Ltd., Mumbai, India.

Minor projects

1. Conversion of 1,2,3-trichlorobenzene into valuable chemicals, Funded (4.32 lakh; 1 year; April 2015) by Kutch Chemical Industries Limited, Baroda.

2. Esterification and etherification reactions using solid catalysts for surfactants synthesis, Funded by (Rs. 1 lakh; 1 year; April 2014) Syntron Industries Pvt. Ltd., Ahmadabad, Gujarat.

3. Catalytic route for synthesis of decanonitrile, Funded (Rs. 4.34 lakh; 6 months; April 2014 to September 2014) by Transpek Industry, Ltd., Vadodara, India.

4. Extraction of Sugars from Molasses and Value Addition to Extracted Sugars, Funded (Rs. 1 lakh; 6 months; October 2013 to March 2014) by Department Of Science and Technology, SERC, New Delhi, India, under Innovative Entrepreneurship Development Centre (IEDC).

5. Synthesis of green surfactant (alkyl glycosides) from sugars available in molasses using solid acid catalysts, Funded (Rs. 1 lakh; 6 months; October 2012 to March 2013) by Department Of Science and Technology, SERC, New Delhi, India, under Innovative Entrepreneurship Development Centre (IEDC).

6. Titanium dioxide coating for hydrophobic and medical applications, Funded (Rs. 1 lakh; 6 months; October 2010 to March 2011) by Department Of Science and Technology, SERC, New Delhi, India, under Innovative Entrepreneurship Development Centre (IEDC) in 2011.

7. Synthesis of Iron Oxide Supported Solid Acid Catalysts for Organic Transformations, Funded (1 lakh; 1 year; July 2009 to June 2010) by Newreka *Green Synth* Technologies Pvt. Ltd., Mumbai, India.

Others

Memberships:

- Life time membership of Catalysis Society of India from December 2020.
- Life time membership of Society for Materials Chemistry (SMC) from January 2015.
- Membership of American Chemical Society for year 2018-2019.

Reviewer services

- Reviewer services to various international journals and project funding agencies.

Honours

- Achiever's Award (in research) for the year 2013-14 by D.D. University Alumni Association.
- Dr. D.O. Shah Research Excellence Award 2013 by Shah-Schulman Centre for Surface Science and Nanotechnology, D. D. University, Nadiad, Gujarat.

Highlights of achievements

- Completed 7 major and 7 minor research projects sponsored by DST, UGC, GUJCOST, ONGC and various industries.
- Guided 4 PhD. and 18 M.Tech students.
- Three patents.
- Contributed in more than 60 national and international conferences.
- Cleared National Eligibility Test (NET) CSIR-JRF June 2004.