

Curriculum Vitae

Dr. (Mrs.) Archana Chaudhary
Scientist (Under DST WOS-A Scheme)

Discipline of Chemistry,
Indian Institute of Technology-Indore
Indore- 452017, (M.P.) India

Phone no.- +91-9713753800 (Mobile)
+91-731-2438552 (Office)

E-mail: archana19jpr@gmail.com

Date of Birth- **19-10-1984**

Title of the present research project
(DST-WOS A)

*“Design and development of metal/metal
oxides nano particles and their catalytic
applications”*

Experience- More than three years of Research Experience.

Technical Skills

- ✓ Expertise in the synthesis of metal/metal oxide nano-particles using bottom approaches such as- Sol-gel, Solvo/hydrothermal.
- ✓ Expertise in handling air and moisture sensitive reactions and products such as metal alkoxides using standard schlenk/double line techniques.
- ✓ Expertise in organic transformations using nano-catalysts and Photocatalytic degradation of organic dyes using nano-materials.
- ✓ Well-versed in handling of sophisticated instruments such as- Powder XRD, Scanning Electron Microscopy (SEM), Energy-dispersive X-ray spectroscopy (EDS), Atomic Force Microscope (AFM), Gas chromatography–mass spectrometry (GC-MS), Dynamic light scattering (DLS), Single Crystal XRD, Fourier transform infrared spectroscopy (FT-IR), Ultraviolet–visible (UV-Vis) spectroscopy.

- ✓ Expertise in synthesis of organic ligands and inorganic complexes and their further characterization using NMR (^1H and multinuclear NMR), FT-IR, SC-XRD, Mass spectrometry and Thermogravimetric analysis (TGA).

Professional skills

- ✓ Experienced in mounting of single crystal & structure solving (Data collection, Data reduction) by using Shelx package up to publication level
- ✓ Well versed with ORTEP, Mercury, Diamond for plotting molecular structures.

Computational skills

- ✓ Well versed with Microsoft Office (Word, Excel, and Power Point).
- ✓ Chem draw for schematic diagram.
- ✓ Origin for plots.

Academic Qualifications

Degree/ Class	University	Division/percentage	Duration
Ph.D.	University of Rajasthan, Jaipur	Awarded	2007-2012
M.Sc. (Org. Chemistry)	M. J. P. Rohilkhand University, Bareilly	I st Division (74%)	2003-2005
B.Sc. (CBZ)	M. J. P. Rohilkhand University, Bareilly	I st Division (69%)	2000-2003
12 th (Science)	U. P. Board, Allahabad	I st Division (73%)	1998-2000
10 th (Science)	U. P. Board, Allahabad	I st Division (68%)	1996-1998

Title of Ph.D. Thesis:

“Synthesis and characterization of some single source molecular precursors of early transition metals for the preparation of ceramic material”

Research Supervisor: **Dr. (Mrs.) M. Nagar**

Department of Chemistry

University of Rajasthan

Jaipur - 302004 (India)

Achievements & Awards

- ✓ Qualified Graduate Aptitude Test in Engineering (**GATE**) Examination-2013.
- ✓ Awarded research grant under Women Scientist (**WOS-A**) scheme of Department of Science and Technology (**DST**), New Delhi (2016-till date).
- ✓ Awarded Research Associate-ship (**RA**) of Council of Scientific and Industrial Research (**CSIR**), New Delhi (2013-2016).
- ✓ Awarded Research Associate-ship (**RA**) of Sophisticated Instrumentation Center (**SIC**), Indian Institute of Technology-Indore (**IIT-I**), Indore (February 2013-March 2013).
- ✓ Senior Research Fellow (**SRF**) of Council of Scientific and Industrial Research (**CSIR**), New Delhi (2010-2012).
- ✓ Junior Research Fellow (**JRF**) and Senior Research Fellow (**SRF**) of Department of Science and Technology (**DST**), New Delhi (2007-2010).

Conference Attended

1. *“Frontiers in Inorganic and Organometallics”* organized by Discipline of Chemistry, Indian Institute of Technology-Indore, 14-15 April 2016 (Paper was selected for flash presentation).
2. *“National Symposium on Emerging Trends in Advanced Chemistry (ETAC-08)”* organized by centre for Advance Studies (CAS), Department of Chemistry, University of Rajasthan, Jaipur, during, March 08-10, 2008 (Participated).
3. *“National Symposium on New Frontiers In Chemical Sciences (NFCS-10)”* organized by centre for Advance Studies (CAS), Department of Chemistry, University of Rajasthan, Jaipur, on 25th February, 2010 (Paper was selected for poster presentation).
4. *“47th Annual Convention of Chemists-2010 & International Conference on Recent Advances in Chemical Sciences”* held at School of Studies in Chemistry, Pt. Ravishankar Shukla University, Raipur during December 23-27, 2010 (Paper was selected for oral presentation).

List of Publications

1. "A series of new heteroleptic Hg(II) complexes: Synthesis, crystal structures and photophysical properties." S. M. Mobin,* A. K. Saini, V. Mishra, and **A. Chaudhary,*** *Polyhedron*, **2016**, *110*, 131–141 (Corresponding Author)
2. "Fabrication of innovative ZnO nanoflowers showing drastic biological activity" V. Sharma, A. Mohammad, V. Mishra, **A. Chaudhary**, K. Kapoor and S. M. Mobin, *New J. Chem.*, **2016**, *40*, 2145-2155
3. "Isolation of metastable intermediate in heterometallic Cu(II)-Hg(II) 1D polymeric chain: synthesis, crystal structure and photophysical properties" S. M. Mobin, V. Mishra and **A. Chaudhary**, *Inorg. Chem*, **2015**, *54*, 1293-1299
4. "Acid-Driven Dimensionality Control of Cd(II) Complexes: From Discrete Double Open Cubane to One- and Three-Dimensional Networks" S. M. Mobin, V. Mishra, **A. Chaudhary**, D. K. Rai, A. A. Golov and P. Mathur, *Cryst. Growth & Des.*, **2014**, *14*, 4124-4137
5. "Syntheses and characterization of a new class of vanadia precursors of oxime-modified oxovanadium(V) isopropoxide, crystal and molecular structure of $[VO\{ONC_{10}H_{16}\}_3]$ " **A. Chaudhary**, N. Sharma M. Nagar, S. M. Mobin, P. Mathur and R. Bohra, *J. Sol-Gel Sci. & Tech.*, **2014**, *70*, 462-472
6. "Syntheses and characterization of a new class of zirconia precursors of oxime-modified zirconium(IV) isopropoxide" **A. Chaudhary**, R. Gopal, M. Nagar and R. Bohra, *J. Sol-Gel Sci. & Tech.*, **2014**, *69*, 102-106
7. "Sol-gel synthesis of highly pure α -Al₂O₃ nano-rods from a new class of precursors of salicylaldehyde-modified aluminum(III) isopropoxide. Crystal and molecular structure

- of*[Al(OC₆H₄CHO)₃]" A. R. Sanwaria, M. Nagar, R. Bohra, **A. Chaudhary**, S. M. Mobin, P. Mathur and B. L. Choudhary, *RSC Advances*, **2014**, *4*, 30081–30089
8. "Non-aqueous synthesis of nano-sized aluminium(III) isopropoxidederivatives with 8-hydroxyquinoline and their sol–geltransformation to nano-sized δ -alumina" A. R. Sanwaria, N. Sharma, **A. Chaudhary** and M. Nagar, *J. Sol-Gel Sci. & Tech.*, **2013**, *68*, 245-253
9. "Molecular precursors for the preparation of homogenous zirconia–silica materials by hydrolytic sol–gel process in organic media. Crystal structures of [Zr{OSi(O^tBu)₃}₄(H₂O)₂].2H₂O and [Ti(O^tBu){OSi(O^tBu)₃}₃]" V. Dhayal, **A. Chaudhary**, B. L. Choudhary, M. Nagar, R. Bohra, S. M. Mobin and P. Mathur, *Dalton Trans*, **2012**, *41*, 9439-9450
10. "Synthesis and characterization of some bis(cyclopentadienyl)titanium(IV) complexes with internally functionalized oximes(LH): Sol-gel transformations of Cp₂TiCl₂, Cp₂TiCIL and Cp₂TiL₂ to nano-sized anatase titania" **A. Chaudhary**, N. Sharma, V. Dhayal, A. Saxena, M. Nagar and R. Bohra, *Appl. Organomet. Chem.*, **2011**, *25*, 198-206
11. "Chemically modified oximato complexes of titanium(IV) isopropoxide as new precursors for the Sol-Gel preparation of nano-sized titania. Crystal and molecular structure of [Ti{ONC₁₀H₁₆}₄.2CH₂Cl₂]" **A. Chaudhary**, V. Dhayal, M. Nagar, R. Bohra, S. M. Mobin and P. Mathur, *Polyhedron*, **2011**, *30*, 821-831

References

Dr. Shaikh M. Mobin

Assistant Professor
Indian Institute of
Technology Indore,
Indore - 452017
Madhya Pradesh, India
Tel : +91-731-2438762
Email: xray@iiti.ac.in

Dr. M. Nagar

Associate Professor
Department of Chemistry
University of Rajasthan
Jaipur-302004
Tel: +91-141-2785761;
Fax: +91-141-2700364
Email: nagar_meena@yahoo.com

Dr. R. Misra

Associate professor
Indian Institute of Technology
Indore,
Indore - 452017
Madhya Pradesh, India
Tel : +91-731-2438710
Email: rajneeshmisra@iiti.ac.in

Summary of the research Work

At present I am engaged in the catalytic applications of nano metal/metal oxides which are the main focus of my DST WOS-A project. I have synthesized various oxides such as ZnO, CuO, CuO-Cr₂O₃ composite etc. and testing their catalytic applications for organic transformations.

I have synthesized these materials by Solvothermal method and characterized them by PXRD, FT-IR, Surface morphology was investigated by SEM/AFM, Particle size was measured by TEM and Surface area and pore size was measured by BET-surface analysis. The Catalytic reactions were monitored by GC-MS.

During my Doctorate (at Rajasthan University) and Post Doc (as RA at IIT-I) I have synthesized various single source molecular precursors (SSMPs) and used them for synthesis of nano metal oxides viz. TiO₂,^{1,2} ZrO₂,³ VO₂,⁴ V₂O₅,⁴ Al₂O₃,^{5,6} ZnO,⁷ ZrSiO₄,⁸ and ZnAl₂O₄. I have also studied the biological applications of ZnO nano-flowers⁷ and photo-catalytic applications of ZnAl₂O₄ nano-particles.

Besides I have isolated an heterometallic Cu(II)-Hg(II) intermediate during the synthesis of a Cu(II)-Hg(II) polymer⁹ and studied the role of different acids in the dimensionality control of some Cd(II) complexes.¹⁰

References-

- (1) *Appl. Organomet. Chem.*, **2011**, 25, 198-206 (2) *Polyhedron*, **2011**, 30, 821-831
- (3) *J. Sol-Gel Sci. & Tech.*, **2014**, 70, 462-472 (4) *J. Sol-Gel Sci. & Tech.*, **2014**, 69, 102-106
- (5) *RSC Advances*, **2014**, 4, 30081–30089 (6) *J. Sol-Gel Sci. & Tech.*, **2013**, 68, 245-253 (7) *New J. Chem.*, 2016, 40, 2145-2155 (8) *Dalton Trans*, **2012**, 41, 9439-9450
- (9) *Inorg. Chem.* **2015**, 54, 1293-1299 (10) *Cryst. Growth & Des.*, **2014**, 14, 4124-4137