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Associate Professor

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Research area

Bioactive transition metal complexes

Metallosupramolecular chemistry

Metal Organic Frameworks

Teaching

Coordination chemistry, Main group elements,

Supramolecular chemistry, Two Dimensional materials,

Molecular Symmetry and Group Theory

Qualitative and quantitative inorganic analysis

Career

- Associate Professor, Dept. of Applied Chemistry, CUSAT, Kochi (August 2022 onwards).
- Assistant Professor, Dept. of Applied Chemistry, CUSAT, Kochi (June 2019 August 2022).
- Assistant Professor, Dept. of Chemistry, Sree Krishna College, Guruvayur, Thrissur (August 2010 to June 2019).
- UGC Dr DS Kothari Post-Doctoral Fellow (Under Prof. P.S. Mukherjee) Inorganic and Physical Chemistry, Indian Institute of Science (IISc) Bangalore (July 2009 to August 2010).
- Lecturer in Chemistry (on contract), Dept. of Applied Chemistry, CUSAT, Kochi (January 2008 to June 2009).
- PhD (Under Prof. M.R.P. Kurup), Dept. of Applied Chemistry, CUSAT, Kochi (2004 to 2008).

Awards/Honours

- Dr DS Kothari Post-Doctoral Fellowship, UGC, 2009
- UGC-JRF/Lectureship in Chemistry, UGC-CSIR, 2004
- KSCSTE-JRF in Chemistry, KSCSTE, Kerala, 2003
- MSc Vth rank, University of Kerala, 2003

List of Publications

1. Synthesis, crystal structure, Hirshfeld surface analysis, DFT, molecular docking and *in vitro* antitumor studies of (2E)-2-[4-(diethylamino)benzylidene]-N-ethylhydrazinecarbothioamide, K. Preetha, E.B. Seena, P.K. Maniyampara, E. Manoj, M.R.P. Kurup, Journal of Molecular Structure, 1295 (2024) 136700..
2. DNA and BSA Binding Studies of New Pd(II) Bisthiocarbohydrazone Complexes: From Anticancer Drug Analogue to Anticovid Candidates, K.K. Mohammed Hashim, E. Manoj, Inorganic Chemistry Communications, 157 (2023) 111326.
3. Solvothermal Self-Assembly of a Novel Metal-Organic Square Grid Complex Using a Biscarbohydrazone Ligand Building Block: Crystal Structures, Hirshfeld and Void Surface Analyses, Band Gap Calculations and DFT Studies, M. Sooraj, E. Manoj, M.R.P. Kurup, Polyhedron, 244 (2023) 116583.
4. Monomeric and dimeric cadmium(II) complexes of N4-phenyl semicarbazones: Spectral features, thermogravimetric analysis, DFT study and crystal structure of a bromido bridged complex, M. Sithambaresan, E. Manoj, M.R.P. Kurup, Polyhedron, 242 (2023), 116506.
5. Novel cobalt complexes of pyridine-based NNS donor thiosemicarbazones: Synthesis, X-ray characterization, DFT calculations, Hirshfeld surface analysis, and molecular docking study, P. K. Maniyampara, L. K. Suresh, K. Jayakumar, E. Manoj, M.R.P. Kurup, Journal of Molecular Structure, 1275 (2023) 134680.
6. Bis(thio)carbohydrazone Luminogens with AIEE and ACQ Features and Their *In Silico* Investigations with SARS-CoV-2, K.K. Mohammed Hashim, E. Manoj, M.R.P. Kurup, Chemistry Select, 7 (2022) e20220122.
7. A novel manganese(II) bisthiocarbohydrazone complex: Crystal structures, Hirshfeld surface analysis, DFT and molecular docking study with SARS-CoV-2, K.K.M. Hashim, E. Manoj, M.R.P. Kurup, Journal of Molecular Structure, 1246 (2021) 131125.
8. Nickel(II) complexes of N(4)-substituted thiosemicarbazones derived from pyridine-2-carbaldehyde: Crystal structures, spectral aspects and Hirshfeld surface analysis, P.F. Rapheal, E. Manoj, M.R.P. Kurup, H.-K. Fun, Journal of Molecular Structure, 1237 (2021) 130362.

9. Zinc(II) complexes of N(4)-monosubstituted thiosemicarbazones derived from pyridine-2-carbaldehyde: Structural and spectroscopic studies, P.F. Rapheal, E. Manoj, M.R.P. Kurup, P. Venugopalan, *Chemical Data Collections* 33 (2021) 100681
10. Molecular trail for the anticancer behavior of a novel copper carbohydrazone complex in BRCA1 mutated breast cancer, R.S. Nair, E. Manoj, R. Thankappan, S.K. Chandrika, M.R.P. Kurup, P. Srinivas, *Molecular Carcinogenesis* 56 (2017) 1501.
11. Crystal structure of aqua[(E)-N'-(5-bromo-2-oxidobenzyl-idene-κO)benzohydrazidato-κ²O,N']dioxidomolybdenum(VI) dimethylformamide monosolvate, R. Sudheer, M. Sithambaresan, N.R. Sajitha, E. Manoj, M.R.P. Kurup, *Acta Cryst.* E71 (2015) 702.
12. Formation of an unusual copper(II) complex from the degradation of a novel tricopper(II) carbohydrazone complex, E. Manoj, M.R.P. Kurup, R.P. John, M. Nethaji, A. Punnoose, *Inorganic Chemistry Communications*, 12 (2009) 952.
13. Preparation, magnetic and EPR spectral studies of copper(II) complexes of an anticancer drug analogue, E. Manoj, M.R.P. Kurup, A. Punnoose, *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, 72 (2009) 474.
14. Structural and spectral studies of nickel(II) complexes with N(4),N(4)-(butane-1,4-diyl) thiosemicarbazones, E. Manoj, M.R.P. Kurup, *Polyhedron*, 27 (2008) 275.
15. Synthesis and spectral studies of bithiocarbohydrazone and biscarbohydrazone of quinoline-2-carbaldehyde: Crystal structure of bis(quinoline-2-aldehyde) thiocarbohydrazone, E. Manoj, M.R.P. Kurup, E. Suresh, *J. Chem. Cryst.*, 38 (2008) 157.
16. Self-assembled macrocyclic molecular squares of Ni(II) derived from carbohydrazones and thiocarbohydrazones: Structural and magnetic studies, E. Manoj, M.R.P. Kurup, H.-K. Fun, A. Punnoose, *Polyhedron*, 26 (2007) 4451.
17. Macrocyclic molecular square complex of zinc(II) self-assembled with a carbohydrazone ligand, E. Manoj, M.R.P. Kurup, H.-K. Fun, *Inorganic Chemistry Communications*, 10 (2007) 324.
18. Synthesis and EPR spectral studies of manganese (II) complexes derived from pyridine 2-carbaldehyde based N(4)-substituted thiosemicarbazones: Crystal structure of one complex, P.F. Rapheal, E. Manoj, M.R.P. Kurup, *Polyhedron*, 26 (2007) 5088.
19. Synthesis and spectral characterization of zinc(II) complexes of N(4)-substituted thiosemicarbazone derived from salicylaldehyde: Structural study of a novel -OH free Zn(II) complex, L. Latheef, E. Manoj, M.R.P. Kurup, *Polyhedron*, 26 (2007) 4107.
20. Copper(II) complexes of N(4)-substituted thiosemicarbazones derived from pyridine-2-carbaldehyde: Crystal structure of a binuclear complex, P. F. Rapheal, E. Manoj, M.R.P. Kurup, *Polyhedron*, 26 (2007) 818.
21. Structural and spectral studies of novel Co(III) complexes of N(4)-substituted thiosemicarbazones derived from pyridine-2-carbaldehyde, P.F. Rapheal, E. Manoj, M.R.P. Kurup, E. Suresh, *Polyhedron*, 26 (2007) 607.

22. 2-Hydroxyacetophenone 4-phenylthiosemicarbazone, E.B. Seena, E. Manoj, M.R. Prathapachandra Kurup, *Acta Cryst. Cryst. Struc. Commun.* C62 (2006) o486.
23. Salicylaldehyde N(4)-hexamethyleneiminy thiosemicarbazone, L. Latheef, E. Manoj, M.R.P. Kurup, *Acta.Cryst, Cryst. Struc. Commun.* C62 (2006) o16.
24. N''-N'''-bis[di(2-pyridinyl)methylene]carbonic dihydrazide, E. Manoj, M.R.P. Kurup, H.-K. Fun, S. Chantrapromma, *Acta.Cryst.* E61 (2005) o4110.
25. [Di-2-pyridyl ketone N⁴, N⁴-(butane-1,4-diyl)thiosemicarbazonato-k³ N, N', S] dioxovanadium(V), V. Philip, E. Manoj, M.R.P. Kurup, M. Nethaji, *Acta Cryst, Cryst. Struc. Commun.* C61 (2005) m488.
26. N-(Pyridin-2-yl)hydrazinecarbothioamide, P.F. Rapheal, E. Manoj, M.R.P. Kurup, E. Suresh, *Acta Cryst.* E61 (2005) o2243.

Seminar Presentations/Invited Talks

1. *In Vitro And In Silico DNA And BSA Binding Studies Of New Bioactive Pd(II) Complexes*", K. K. Mohammed Hashim & E. Manoj, National Seminar on Frontiers in Chemical Sciences (FCS 2023), University of Calicut, Kerala 2023. **(Secured the best poster award)**
2. Synthesis, Spectral Features, Photocatalytic and DFT Studies of Novel Nickel(II) Complexes of Quinoline-2-carbaldehyde-N(4)-Cyclohexylthiosemicarbazone, A. Mohan & E. Manoj, National Seminar on Frontiers in Chemical Sciences (FCS 2023), University of Calicut, Kerala 2023.
3. Crystal Structure and Surface Area Calculation of a Stable Self-Assembled Ni(II) Metallosupramolecular Square Grid Complex, M. Sooraj & E. Manoj, International Conference on Materials for the Millennium (MatCon-2023), CUSAT January 2023.
4. A Novel Coumarin Based Carbohydrazone as Highly Efficient Antibacterial and Antioxidant Agent", A. Santu & E. Manoj, International Conference on Materials for the Millennium (MatCon-2023), CUSAT January 2023.
5. A Novel Double-stranded Homotopic Helical Cobalt (III) Complex as a Highly Selective Fluorescent Sensor for Nanomolar Detection of Explosive Picric Acid, L. V. Menon & E. Manoj, International Conference on Materials for the Millennium (MatCon-2023), CUSAT January 2023.
6. Crystal structures, Spectral aspects, DFT studies and Molecular docking of Copper(II) chelates based on an ONS Donor Thiosemicarbazone ligand, J.M. Jacob, E. Manoj, M.R.P. Kurup, International Conference on Materials for the Millennium (MatCon-2023), CUSAT January 2023.
7. Synthesis And Spectral Studies of Novel Cobalt Complexes of Quinoline-2-carbaldehyde N(4)-cyclohexylthiosemicarbazone and their *in silico* Molecular

- Docking with Duplex DNA", T.M. Kavya, Lakshmi V. Menon, K.K.M. Hashim, E. Manoj, International Seminar on "Current Trends in Chemistry, CTriC 2022" CUSAT 2022.
8. Crystal Structures and Band Gap Calculations of a Novel Self Assembled [2×2] Metallosupramolecular Grid and its Biscarbohydrazone Ligand Building Block, M. Sooraj, E. Manoj, International Seminar on "Current Trends in Chemistry, CTriC 2022" CUSAT 2022.
 9. A Turn-on Fluorescent Sensor for the Detection of Zn (II) and Cd (II) Ions based on Thiocarbohydrazone derived Schiff-Base, Lakshmi V. Menon, E. Manoj, International Seminar on "Current Trends in Chemistry, CTriC 2022" CUSAT 2022.
 10. Novel Cobalt Complexes of Pyridine-Based Heterocyclic Thiosemicarbazone: Synthesis, Characterization and Computational Studies, Pramod Kumar M, E. Manoj, M.R.P. Kurup, International Seminar on "Current Trends in Chemistry, CTriC 2022" CUSAT 2022.
 11. Synthesis, characterization and theoretical studies on Pd(II) thiocarbohydrazone complexes and their biological implications using *in silico* molecular docking, K.K. Mohammed Hashim & E. Manoj, virtual conference 'Medchem-2021' on "Emerging infectious diseases and therapeutic strategies" Indian Institute of Technology Madras, Chennai 2021.
 12. Structural, spectral and theoretical investigations on bis(thio)carbohydrazones of 3,5-diiodosalicylaldehyde and their biological *in silico* studies, K.K.M. Hashim, E. Manoj, M.R.P. Kurup, National Webinar on Recent Advances in Solid State Chemistry and Allied Sciences, School of Physical Sciences, Central University of Kerala 2021. **(Secured the best oral presentation award)**
 13. Structural aspects of manganese(II) thiocarbohydrazone complexes, K.K.M. Hashim, E. Manoj, M.R.P. Kurup, International Conference on Materials for the Millennium (MatCon-2021), CUSAT 2021
 14. EPR spectral Study of Self-assembled manganese(II) coordination frameworks, E. Manoj, M.R.P. Kurup, Advances in Applied Physics and Applications, Sree Krishna college, Guruvayur, 2018.
 15. Magnetic properties of materials, UGC sponsored national seminar on "Chemical Applications of Spectroscopic Techniques" (NSCAST-2015) 12 & 13 February 2015 @ Sree Narayana College, Punalur **(Invited Talk)**.
 16. Magnetic Properties of Chemical Substances, UGC sponsored national seminar on 'Characterization Techniques in Chemistry' 16&17 December 2014 @ KKTM Government college, Kodungallur **(Invited Talk)**.
 17. Self-assembled square grid complexes of Zn(II) and Cd(II): MALDI MS spectral study, E. Manoj, M.R.P. Kurup, Modern Trends in Inorganic Chemistry, MTIC-2007, IIT Chennai.

18. Self-assembled molecular square grid complexes of carbohydrazone ligands, E. Manoj, M.R.P. Kurup, A. Punnoose, International Conference on Materials for the Millenium, MatCon-2007, CUSAT, Kochi.
19. Structural and Spectral studies of novel Co(III) complexes of N(4)-Substituted thiosemicarbazones derived from pyridine-2-carbaldehyde, P.F. Rapheal, E. Manoj, M.R.P. Kurup, H.-K. Fun, National conference on the role of Analytical Chemistry in Materials Science and Technology, ACIMSAT-2006, Munnar.
20. Self-assembly of a macrocyclic molecular square: Structural and magnetic studies, E. Manoj, M.R.P. Kurup, H.-K. Fun, A. Punnoose, National seminar on Frontiers in Chemistry, FIC-06, CUSAT, Kochi.
21. Structural and spectroscopic studies of a novel ligand pyridine-2-carbaldehyde-N(4)-p-methoxyphenyl thiosemicarbazone (HL) and it's Zinc(II) complexes, P.F. Rapheal, E. Manoj, M.R.P. Kurup, P.Venugopalan, National seminar on Frontiers in Chemistry, FIC-06, CUSAT, Kochi.

Patent

- A metal complex and a process thereof, P. Srinivas, M.R.P. Kurup, E. Manoj, R.S. Nair, Indian Pat. No. 286230 dt 10-08-2017.

Research Guidance

- Ph.D—ongoing-6 , M.Phil -completed-1

Projects

- Probing Cobalt Complexes based Hole Transporting Materials for Photovoltaic Applications- ongoing (25.03 Lakhs, RUSA-MHRD for CUSAT-Govt of India, 2023-2025).
- Structural and biological investigations of transition metal complexes of Schiff based ligands bearing heterocyclic systems- completed (2.75 Lakhs, CUSAT/PL(UGC), 2021-2023).
- Probing self-assembled novel magnetic materials: - Structural and spectral investigations- completed (2 Lakhs, UGC MRP, 2014-2016).

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