*Dr. Kollipara Mohan Rao*

*Professor*

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#### Administrative Experience

#### Head, SAIF: From September 2013 to February 2015

Head, Department of Chemistry: From February 2015 to February 2018

Dean, Physical Sciences, From: February 3rd, 2020 to

Member

i. School Board Member

ii. BOS

iii. Academic Council

iv. University Court

**Academic Background**

**M.Sc**. Sri Venkateswara University (1981)

**Ph.D.** Indian Institute of Technology Kanpur (1988)

#### Research Interests / Specialization

Inorganic Chemistry: Areas of Research Interest: Organometallic Chemistry of Platinum group metals

**Topics of Research Interests**

Arene ruthenium chemistry

Cyclopentadienyl and pentamethylcyclopentadienyl and indenyl chemistry of ruthenium and osmium metals

Pentamethylcyclopentadienyl chemistry of rhodium and iridium metals

**Research Experience**

* Visiting Professor,Universitat Autonoma de Barcelona, Spain. Syntheses and Characterization of New Ruthenium dimers with Trpy and the Dinucleating bpp- ligands. Applications to Water Oxidation Catalysis.
* Senior Research Associate (Pool Officer), School of Chemistry, University of Hyderabad, India.
* Post-Doctoral Fellow, University of Notre Dame, Notre Dame, Indiana, USA. Responsibilities involved Synthesis and Characterization of Metallo-porphyrins
* Post-Doctoral Fellow, Iowa State University of Science and Technology, Ames, Iowa, USA. Responsibilities involved Hydrodesulfurization-- Which included the synthesis and characterization of various thiophene complexes of platinum group metals.
* Post-Doctoral Fellow, Salford University, Salford, U. K. Responsibilities included; Synthesis and investigation of the reactivity of the anion [Cp\*Pt(CO)]-. Also, compounds of the type [Cp\*Pt(PR3)X] were made. These complexes would readily undergo Diels-Alder addition in the Cp\* ring to form η1, η2-Cp\* complexes.

**Representative publications:**

153. Lathewdeipor Shadap, Jaya Lakshmi Tyagi, Nipanshu Agarwal, Vivek Chetry, Krishna Mohan Poluri, Werner Kaminsky, Mohan Rao Kollipara. Arene ruthenium, rhodium and iridium complexes containing benzamide derivative ligands: Study of interesting bonding modes, antibacterial, antioxidant and DNA binding studies. Journal Organometallic Chemistry 937 (2021) 121731.

152. Lathewdeipor Shadap, Jaya Lakshmi Tyagi, Krishna Mohan Poluri, Sergei Novikov, Chun-Wan Timothy Lo, Yurij Mozharivskyj, Mohan Rao Kollipara. Synthesis and biological evaluation of some new class of benzothiazole-pyrazole ligands containing arene ruthenium, rhodium and iridium complexes. Transition Metal Chemistry 46 (2021) 231–240. (DOI: 10.1007/s11243-020-00439-z).

151. Kaushik Bhattacharjee, Narasinga Rao Palepu, Kollipara Mohan Rao. Santa Ram Joshi. Precursor‑directed combinatorial biosynthesis of cephalosporin analog by endolithic actinobacterium Streptomyces sp. AL51 by utilizing thiophene derivative 3 Biotech (2018) 8:31 https://doi.org/10.1007/s13205-017-1051-8.

150. Lincoln Dkhar, Marrily, Santa Ram Joshi, Mohan Rao Kollipara. Cp and indenyl ruthenium complexes containing dithione derivatives: Synthesis, antibacterial and antifungal study. Journal Organometallic Chemistry 923 (2020) 121418.

149. Lathewdeipor Shadap, Venkanna Banothu, Emma Pinder, Roger M. Phillips, Werner Kaminsky, Mohan Rao Kollipara. In-vitro biological evaluation of half sandwich platinum group metal complexes containing benzothiazole moiety. J. Coord. Chem. 73(10) 2020 1538-1553.

148. Agreeda Lapasam, Werner Kaminsky and Mohan Rao Kollipara. Crystal structure of 1, 2, 3, 4 - tetrahaptohexakiscarbomethoxybenzene (η5-pentamethylcyclopentadienyl) rhodium complex. Journal of Chemical Crystallography 2020. https://doi.org/10.1007/s10870-020-00836-3

147. Lincoln Dkhar, Venkanna Banothu, Emma Pinder, Roger M. Phillips, Werner Kaminsky, Mohan Rao Kollipara. Ru, Rh and Ir metal complexes of pyridyl chalcone derivatives: Their potent antibacterial activity, comparable cytotoxicity potency and selectivity to cisplatin. Polyhedron 185 (2020)114606.

### 146. Lathewdeipor Shadap, Jaya Lakshmi Tyagi, Krishna Mohan Poluri, Sergei Novikov, Chun-Wan Timothy Lo, Yurij Mozharivskyj, Mohan Rao Kollipara. Insights to the strained thiocarbamate derivative complexes of platinum group metals induced by azide as a co-ligand: Characterization and biological studies*.* Journal Organometallic Chemistry 920 (2020) 121345.

145. Agreeda Lapasam, Mohan Rao Kollipara. A survey of Crystal structure and biological activities of platinum group metal complexes containing N-Acyl-thiourea ligands.Journal ofPhosphorus, Sulfur, and Silicon and the Related Elements 195(10) 2020 779-804.https://doi.org/10.1080/10426507.2020.1764956

144. Lincoln Dkhar, Venkanna Banothu, Krishna Mohan Poluri, Werner Kaminsky, Mohan Rao Kollipara. Platinum group complexes containing salicylaldehyde based thiosemicarbazone ligands: Their synthesis, characterization, bonding modes, antibacterial and antioxidant studies. Journal of Organometallic Chemistry 918 (2020) 121298.

143. Agreeda Lapasam, **Sanjay Adhikari,** Venkanna Banothu, **Uma Adepally,** Mohan Rao Kollipara. Arene platinum group metal complexes containing imino-quinolyl ligands: Synthesis and antibacterial studies. J. Coord. Chem. 73 (5), 2020, 737-753.

142. Mohan Rao Kollipara, Lathewdeipor Shadap, Venkanna Banothu, Nipanshu Agarwal, Krishna Mohan Poluri, Werner Kaminsky. Fluorenone Schiff base derivative complexes of ruthenium, rhodium and iridium exhibiting efficient antibacterial activity and DNA-binding affinity. Journal Organometallic Chemistry 915 (2020) 121246.

141.  Lincoln Dkhar, Venkanna Banothu, Werner Kaminsky, Mohan Rao Kollipara. Synthesis of half sandwich platinum group metal complexes containing pyridyl benzothiazole hydrazones: Study of bonding modes and antimicrobial activity. Journal Organometallic Chemistry 914 (2020) 121225.

140. Agreeda Lapasam, Ibaniewkor L. Mawnai, Venkanna Banothu, Werner Kaminsky, Mohan Rao Kollipara. Ruthenium, rhodium and iridium complexes containing pyrimidine based thienyl pyrazoles: Synthesis and antibacterial studies. J. Organomet. Chem. 911 (2020) 121155.

139. Lathewdeipor Shadap, Venkanna Banothu, **Uma Addepally, Sanjay Adhikari,** Mohan Rao Kollipara. Variable structural bonding modes and antibacterial studies of thiosemicarbazone ligands of ruthenium, rhodium and iridium metal complexes. J. Coord. Chem. 2020, vol. 73, no. 1, 175**–**187.

138. Lathewdeipor Shadap, Jaya Lakshmi Tyagi, Krishna Mohan Poluri, Emma Pinder, Roger M. Phillips, Werner Kaminsky, Mohan Rao Kollipara. Synthesis, structural and in-vitro functional studies of half-sandwich platinum group metal complexes having various bonding modes of benzhydrazone derivative ligands. Polyhedron, 176 (2020) 114293.

137. Agreeda Lapasam,Venkanna Banothu, Uma Addepally,Mohan Rao Kollipara. Half-sandwich arene ruthenium, rhodium and iridium thiosemicarbazone complexes: Synthesis, characterization and biological evaluation. J Chemical Science 132 (2020) 34.

136. Agreeda Lapasam, Emma Pinder, Roger M Phillips, Werner Kaminsky, Mohan Rao Kollipara. Synthesis, structure and bonding modes of pyrazine based ligands of Cp\*Rh and Cp\*Ir complexes: The study of *in-vitro* cytotoxicity against human cell lines. J. of Organometallic Chemistry 899 (2019) 120887.

135. Lathewdeipor Shadap, Siewdorlang Diamai, Jaya Lakshmi Tyagi, Krishna Mohan Poluri, Werner Kaminsky, Mohan Rao Kollipara. Synthesis, biological evaluation and colorimetric sensing studies of platinum group metal complexes comprising pyrazine based thiourea derivatives. J. of Organometallic Chemistry 897 (2019) 207-216.

134.Agreeda Lapasam,Venkanna Banothu, Addepally Uma,Mohan Rao Kollipara. Synthesis, structural and antimicrobial studies of half-sandwich ruthenium, rhodium and iridium complexes containing nitrogen donor Schiff-base ligands. J. Molecular Str. 1191 (2019) 314-322.

133. Lincoln Dkhar, Werner Kaminsky, Krishna Mohan Poluri, Mohan Rao Kollipara. Versatile coordination modes of benzothiazole hydrazone derivatives towards Ru(II), Rh(III) and Ir(III) complexes and their reactivity studies with azides and activated alkynes. J. of Organometallic Chemistry 891 (2019) 53-64.

132. Lathewdeipor Shadap, Siewdorlang Diamai, Venkanna Banothu, D.P.S. Negi, **Uma Adepally, Werner Kaminsky**, Mohan Rao Kollipara. Half sandwich platinum group metal complexes of thiourea derivative ligands with benzothiazole moiety possessing anti-bacterial activity and colorimetric sensing: synthesis and characterization. J. Organometallic Chemistry 884 (2019) 44-54.

131. Agreeda Lapasam, Omar Hussain, Roger M Phillips, Werner Kaminsky, Mohan Rao Kollipara.Synthesis, characterization and chemosensitivity studies of half-sandwich ruthenium, rhodium and iridium complexes containing к1(S) and к2(N,S) aroylthiourea ligands. J. Organometallic Chemistry 880 (2019) 272-280.

130. Ibaniewkor Lyngdoh Mawnai, Sanjay Adhikari, Lincoln Dkhar, Jaya Lakshmi Tyagi, Krishna Mohan Poluri, Mohan Rao Kollipara. Synthesis and antimicrobial studies of half-sandwich arene platinum group metal complexes containing pyridylpyrazolyl ligands. J. Coordination Chemistry 72 (2019) 294-308.

129. Agreeda Lapasam, Lincoln Dkhar, Nidhi Joshi, Krishna Mohan Poluri, Mohan Rao Kollipara.Antimicrobial selectivity of ruthenium, rhodium, and iridium half sandwich complexes containing phenyl hydrazone Schiff base ligands towards *B. thuringiensis* and *P. aeruginosa* bacteria. *Inorganica chimica Acta,* 484 (2019) 255-263.

128. Basava Punna Rao Aradhyula, Ibaniewkor L. Mawnai, Mohan Rao Kollipara. Pyrazole based mono and di substituted half sandwich d6 platinum group metal complexes: Synthesis and spectral characterization. ZAAC 645 (2019) 79-86.

127. Lathewdeipor Shadap, Nidhi Joshi, Krishna Mohan Poluri, Mohan Rao Kollipara. Werner Kaminsky. Synthesis and structural characterization of arene d6 metal complexes of sulfonohydrazone and triazolo ligands: high potency of triazolo derivatives towards DNA binding. *Polyhedron,* 155 (2018) 302-312.

126. Sanjay Adhikari, Omar Hussain, Roger M Phillips, Werner Kaminsky, Mohan Rao Kollipara. Neutral and cationic half-sandwich arene d6 metal complexes containing pyridyl and pyrimidyl thiourea ligands with interesting bonding modes: Synthesis, structural and anti-cancer studies. *Applied Organomet. Chem*. 32, 2018,e4476**.**

125. Ibaniewkor L. Mawnai, Sanjay Adhikari, Werner Kaminsky, Mohan Rao Kollipara. Synthesis of strained complexes of arene d6 metals with benzoylthiourea and their spectral studies. J. Organometallic Chemistry 869 (2018) 26 **-** 36.

124. Sanjay Adhikari, Omar Hussain, Roger M. Phillips, Werner Kaminsky, Mohan Rao Kollipara. Synthesis, structural and chemosensitivity studies of arene d6 metal complexes having N‐phenyl‐N ́‐(pyridyl/pyrimidyl) thiourea derivatives. Applied Organomet. Chem. 32 (2018) e4362.

123. Basava Punna Rao Aradhyula, Nidhi Joshi, Krishna Mohan Poluri, Mohan Rao Kollipara. Synthesis and antibacterial studies of rhodium and iridium complexes comprising of dipyridyl hydrazones. Journal of Molecular Structure 1164 (2018) 191-199.

122. Basava Punna Rao Aradhyula, Ibaniewkor L. Mawnai, Werner Kaminsky, Mohan Rao Kollipara. Synthesis and spectral studies of sterically hindered half-sandwich d6 metal complexes containing quinoxaline-based electron rich heterocyclic pyrazoles. Inorganica Chimica Acta 476 (2018) 101–109.

121. Sanjay Adhikari, Omar Hussain, Roger M. Phillips, Mohan Rao Kollipara. Half-sandwich d6 metal complexes comprising of 2-substituted-1,8- napthyridine ligands with unexpected bonding modes: Synthesis, structural and anti-cancer studies. Journal of Organometallic Chemistry, 854 (2018) 27-37.

120. Kaushik Bhattacharjee, Narasinga Rao Palepu, Kollipara Mohan Rao, Santa Ram Joshi. Precursor‑directed combinatorial biosynthesis of cephalosporin analog by endolithic actinobacterium Streptomyces sp. AL51 by utilizing thiophene derivative. 3 Biotech 2018 8:31.

119. Kaushik Bhattacharjee, Shakti Kumar, Narasinga Rao Palepu, Pradeep Kumar Patra, Kollipara Mohan Rao, Santa Ram Joshi. Structure elucidation and in silico docking studies of novel furopyrimidine antibiotics synthesized by endolithic bacterium Actinomadura sp. AL2. J. Microbiol Biotechnol (2017) 33:178.

# 118. A. Basava Punna Rao, Werner Kaminsky, Mohan Rao Kollipara. Half-sandwich d6 metal complexes with bis (pyridine carboxamide) benzene ligand: Synthesis and spectral analysis. J. Molecular Str. 1149, (2017) 162-170.

# 117. Sanjay Adhikari, Werner Kaminsky, Mohan Rao Kollipara. Investigation of the coordination chemistry of multidentate azine Schiff-base ligands towards d6 half-sandwich metal complexes. J. Organometallic Chemistry 848 (2017) 95 -103.

116. Mostofa Ataur Rohman, Dipankar Sutradhar, S. Sangilipandi, K. Mohan Rao, Asit K. Chandra, Sivaprasad Mitra. Photophysical behavior of systematically substituted (di-2-pyridylaminomethyl) benzene ligands and its Re(l) complexes: A combined experimental and theoretical approach. Journal of Photochemistry and Photobiology A: Chemistry, **2017,** 341, 115-126.

115. Narasinga Rao Palepu andKollipara Mohan Rao. Synthesis and structural studies of half-sandwich Cp\* rhodium and Cp\* iridium complexes featuring mono, bi and tetradentate nitrogen and oxygen donor ligands. J. Chem. Sciences 2017, 129, 561-571.

114. A. Basava Punna Rao, Khushboo Gulati, Nidhi Joshi, Debojit Kumar Deb, D. Rambabu, Werner Kaminsky, Krishna Mohan Poluri, Mohan Rao Kollipara. Synthesis and biological studies of ruthenium, rhodium and iridium metal complexes with pyrazole-based ligands displaying unpredicted bonding modes. Inorg. Chim. Acta 2017, 462, 223-235.

113. Sanjay Adhikaria, Werner Kaminskyc, Mohan Rao Kollipara. Pyridyl azine Schiff-base ligands exhibiting unexpected bonding modes towards ruthenium, rhodium and iridium half-sandwich complexes: Synthesis and structural studies. J. Organomet. Chem., **2017**, 836-837, 8-16.

112. Narasinga Rao Palepu andKollipara Mohan Rao. Half sandwich ruthenium, rhodium and iridium complexes of triazolopyridine ligand: Synthesis and structural studies. J. Chem. Sciences **2017**, 129,177-184.

111. *Narasinga Rao Palepu†,Werner Kaminsky‡, Mohan Rao Kollipara†.*Synthesis and Structural Studies of Cp\* Rhodium and Cp\* Iridium Complexes of Picolinic hydrazine Ligand. Bull. Korean Chem. Soc. 2017, 38, 99-106.

110. Narasinga Rao Palepu, Sanjay Adhikari, J. Richard Premkumar, Akalesh K Verma, Samantha L Shepherd, Roger M Phillips, Werner Kaminsky, Kollipara Mohan Rao. Half-sandwich ruthenium, rhodium and iridium complexes featuring oxime ligands: Structural studies and preliminary investigation of *in vitro* and *in vivo* antitumor activities. Applied Organometallic Chemistry, (2017), 31, e3640

109. A. Basava Punna Rao, A. Uma, T. Chiranjeevi, M. S. Bethu, J. Venkateswara Rao, Debojit Kumar Deb, Biplab Sarkar, Werner Kaminsky, Mohan Rao Kollipara. The *in vitro* antitumor activity of oligonuclear polypyridyl rhodium and iridium complexes against cancer cells and human pathogens. J. Organomet. Chem. 824(**2016**) 131-139.

108. A. Basava Punna Rao, Mahesh Kalidasan, Krishnakant Gangele, Debojit Kumar Deb, Samanta L. Shepherd, Roger M. Phillips, Biplab Sarkar, Krishna Mohan Poluri, K. Mohan Rao. Synthesis, structural and biological studies of half-sandwich platinum group metal complexes with pyrimidine-based ligands. Chemistry Select **2017**, 2, 2065 –2076

107. Sanjay Adhikari, Narasinga Rao Palepu, Dipankar Sutradhar, Samantha L Shepherd, Roger M Phillips, Werner Kaminsky, Asit K. Chandra, Mohan Rao Kollipara. Neutral and cationic half-sandwich arene ruthenium, Cp\*Rh and Cp\*Ir oximato and oxime complexes: Synthesis, structural, DFT and biological studies. J. Organomet. Chem. **2016**, 820, 70-81.

106. A. Basava Punna Rao, A. Uma, T. Chiranjeevi, M. S. Bethu, B. Yashwanth, J. Venkateswara Rao, Krishna Mohan Poluri, Mohan Rao Kollipara. Synthesis, structural and *in vitro* functional characterization of arene ruthenium complexes with 1, 3, 5-tris(di-2-pyridylaminomethyl) benzene ligand. Inorg. Chim. Acta **2016**, 453, 284-291.

105. Sanjay Adhikari, Dipankar Sutradhar, Samantha L. Shepherd, Roger M Phillips, Asit K. Chandra, K. Mohan Rao. Synthesis, structural, DFT calculations and biological studies of rhodium and iridium complexes containing azine Schiff-base ligands. Polyhedron, **2016**, 117, 404-414.

104. Narasinga Rao Palepu, J. Richard Premkumar, Akalesh K Vermac, Kaushik Bhattacharjee, S. R. Joshi, Scott Forbes, Yurij Mozharivskyj, Werner Kaminsky, Kollipara Mohan Rao*\*. In vitro* Biological Activity Studies of Platinum Group Metal Complexes Containing N, N’- Bis(picolinoyl)hydrazine Ligand. Current Inorganic Chemistry, **2016**, 6, 127-140.

103. Sanjay Adhikari, Werner Kaminsky, K. Mohan Rao. Study of the bonding modes of di-2-pyridyl ketoxime ligand towards ruthenium, rhodium and iridium half sandwich complexes. ZAAC **2016**, 642, 941-946.

102. A. Basava Punna Rao, Narasinga Rao Palepu, Debojit Kumar Deb, A. Uma, T. Chiranjeevi, Biplab Sarkar, Werner Kaminsky, Kollipara Mohan Rao\*. Synthesis, structural, DFT studies and antibacterial evaluation of Cp\*rhodium and Cp\*iridium complexes using hydrazide based dipyridyl ketone ligand. *Inorg. Chim Acta*, **2016**, 443, 126-135.

101. Mahesh Kalidasana, S. Sangilipandia, R. Nagarajaprakashb and K. Mohan Raoa\*. Synthesis and structural studies of arene ruthenium and Cp\*Rh/Cp\*Ir complexes containing pyridylpyrazole and pyridylthiazole based ligands. *Trans. Metal Chem.* **2016***, 41, 261-270.*

100. S. Sangilipandi, Dipankar Sutradhar, [Werner Kaminsky](mailto:kaminsky@chem.washington.edu), Asit K. Chandra, K. Mohan Rao. Synthesis, molecular structure and DFT studies of tricarbonylrhenium(I) complexes containing nitrogen based bis, tris, tetrakis-(di-2-pyridylaminomethyl) benzene ligands. *J. Mole. Structure* **2016**, 1115, 8-16.

99. S. Sangilipandi, Dipankar Sutradhar, Kaushik Bhattacharjee, [Werner Kaminsky](mailto:kaminsky@chem.washington.edu), S. R. Joshi, Asit K. Chandra, K. Mohan Rao\*. Synthesis, structure, antibacterial studies and DFT calculations of arene ruthenium, Cp\*Rh, Cp\*Ir and tricarbonylrhenium metal complexes containing 2-chloro-3-(3-(2-pyridyl) pyrazolyl) quinoxaline ligand. *Inorg. Chim Acta*, 2016, 441, 95-108.

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97. S. Sangilipandi, R. Nagarajaprakash, D. Sutradhar, Werner Kaminsky, A. K. Chandra, K. Mohan Rao. Synthesis, molecular structural studies and DFT calculations of tricarbonyl rhenium(I) metal complexes containing nitrogen-based N∩N donor polypyridyl ligands. *Inorganica Chim. Acta*. 2015, 437, 177-187.

96. Mahesh Kalidasan, R. Nagarajaprakash, Kollipara Mohan Rao. Synthesis, spectral and molecular studies of half-sandwich arene ruthenium and Cp\*Rh/ Cp\*Ir complexes containing bidentate P-N and E-N ligands (E = S, Se) based on diphenyl(2-pyridyl) phosphine. *J. Coord. Chem*. 2015, 68 (21), 3839-51.

95. Mahesh Kalidasan, R. Nagarajaprakash, Kollipara Mohan Rao. Synthesis and molecular studies of half-sandwich arene ruthenium and Cp\*Rh/ Cp\*Ir complexes containing (3-picolyl) thiourea derivatives as N, S-bidentate donor ligand. *Trans. Met. Chem. 2015, 40 (5), 531-539.*

94. Narasinga Rao Palepu, S. L. Nongbri, J. Richard Premkumar, Akalesh Kumar Verma, Kaushik Bhattacharjee, S.R. Joshi, Scott Forbes, Yurij Mozharivskyj, Romita Thounaojam, K. Aguan, Kollipara Mohan Rao. Synthesis and evaluation of new salicylaldehyde-2-picolinylhydrazone Schiff base compounds of Ru(II), Rh(III) and Ir(III) as in vitro antitumor, antibacterial and fluorescence imaging agents" *J. Biol. Inorg. Chem. 2015, 20, 619–638.*

93. K Mahesh, Scott H Forbes, Yurij Mozharivskyj and Kollipara Mohan Rao. Synthesis, spectral and molecular study of half-sandwich η6-arene ruthenium, Cp\*rhodium and Cp\*iridium metal complexes with bidentate ligands. *Z. Anorg. Allg. Chem. 2015, 641, (3-4), 715–723.*

92. K Mahesh, Scott H Forbes, Yurij Mozharivskyj and Kollipara Mohan Rao. Half-sandwich pentamethylcyclopentadienyl group 9 metal complexes of 2-aminopyridyl ligands: Synthesis, spectral and molecular study. *J. Chem. Sci., 2015, 127, 1135-1144.*

91. K Mahesh, Scott H Forbes, Yurij Mozharivskyj, Maryam Ahmadi, Zeynab Ahmadihosseini, Roger M Phillips and Kollipara Mohan Rao. Mononuclear half-sandwich cyclic-π-perimeter platinum group metal complexes having bithiazole ligands: Synthesis, molecular and anti-cancer studies. *Inorg. Chim. Acta 421*,*2014,**349-358.*

90.K. Mahesh, S. H. Forbes, Yurij Mozharivskyj and Kollipara Mohan Rao. Half- sandwich η6-arene ruthenium and Cp\* rhodium/ iridium compounds comprising with thioether ligands: Synthesis, spectral and molecular studies. *Inorg. Chim. Acta 421****,*** *2014,**218-227.*

89.Kota Thirumala Prasad and Kollipara Mohan Rao. Synthesis and structural study of platinum group metal complexes containing pyrimidine bridged pyrazolyl-pyridineligand and η5 and η6 – cyclic hydrocarbons. *J. Chem. Sci. 126,* 2014*, 1143–1151.*

88. Nora Planas, Gemma Christian, Stephan Roeser, Elena Mas-Marzá, Mohan-Rao Kollipara, Jordi Benet-Buchholz, Feliu Maseras, and Antoni Llobet. [Substitution Reactions in Dinuclear Ru-Hbpp Complexes: an Evaluation of Through-Space Interactions](http://pubs.acs.org/doi/abs/10.1021/ic202225g). Inorg. Chem. 2012, *51*(3), 1889–1901.

87. Sairem Gloria, Peng Wang and Kollipara Mohan Rao. "Spectral and Structural Studies of Platinum Group Metal Complexes of 3-(di-2-pyridylaminomethyl) benzamide and formation of Mutual Intermolecular Hydrogen Bonding in some Complexes". *Z. Anorg. Allg. Chem. 2012, 638, (3-4), 634–640.*

86. Venkateswara Rao Anna, Kollipara MohanRao Syntheses, spectral and structural characterization of η5- and η6- cyclic π -perimeter hydrocarbon platinum group metal complexes containing Pyridazine-NHC analogues. *Polyhedron* 34 (2012) 176–180.

1. S. L. Nongbri, Babulal Das and Kollipara Mohan Rao*.* Isolation and spectral studies of water-soluble rhodium and iridium complexes with pyridyl diketone ligands bonded through *ĸ2*-N∩O, *ĸ4*-N∩O and *ĸ3*-N-C-N modes. J. Coordination Chem. 65, 2012, 875–890.

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83. Venkateswara Rao Anna, Raghavaiah Pallepogu, Zhong-Yuan Zhou, Mohan Rao Kollipara*.* Novel Platinum Group Metal Complexes bearing bidentate chelating Pyrimidyl-NHC and Pyrimidyl-NHC thione ligands: Syntheses, Spectral and Structural Characterization. *Inorg. Chimica Acta.* 2012, 387, 37-44.

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80. Sairem Gloria, Gajendra Gupta, Venkateswara Rao Anna, Babulal Das and Kollipara Mohan Rao*.* Hydroxylation of azomethine carbon: isolation of complexes of η5 and η6- cyclic hydrocarbon platinum group metals with new Schiff base ligand. *J. Coord. Chem.* **2011**, 64, 4168–4181.

79. S. L. Nongbri, Babulal Das and Kollipara Mohan Rao*.*  Reactivity study of arene(azido)ruthenium N∩O - base complexes with activated alkynes. *Inorg. Chimica Acta.* 2011, 376, 428–436.

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74. Smita Basu, Gajendra Gupta, Babulal Das, Kollipara Mohan Rao*.* Neutral penta-coordinated diorganotin(IV) complexes derived from *ortho*-aminophenol Schiff bases: Synthesis, characterization and molecular Structures. J. Organomet. Chem. **2010**, 695, 2098-2104.

73. Gajendra Gupta,Bruno Therrien, Kollipara Mohan Rao. Half sandwich platinum group metal complexes containing tetradentate *N*-donor ligand bearing two pyrazolyl-pyridine units linked by an aromatic spacer. J. Organomet. Chem. **2010**, 695, 753-759.

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8. Sairem Gloria, Gajendra Gupta, Babulal Das and K. Mohan Rao. Hydroxylation of azomethine carbon: isolation of complexes of η5- and η6- Cyclichydrocarbons Platinum group metals with new Schiff base ligand. *National Symposium on Organometallic Chemistry and Organic Synthesis: High lights and new Perspectives (OMCOS 2011),* March 28 - 29th, 2011, Department of Chemistry, North Eastern Hill University, Shillong.
9. K. Mahesh and K. Mohan Rao. Synthesis and study of Platinum group metal complexes containing η5- and η6- Cyclichydrocarbons and 4,6-bis(pyridylthio)pyrimidine asa a ligand. *National Symposium on Organometallic Chemistry and Organic Synthesis: High lights and new Perspectives (OMCOS 2011)*, March 28 - 29th, 2011, Department of Chemistry, North Eastern Hill University, Shillong.
10. Saphidabha L. Nongbri and K. Mohan Rao. synthesis and characterization of η5- and η6- cyclic-π-perimeter hydrocarbon platinum group metal complexes of dipyridyl functionalized β-diketones: C-H activation by iridium complex. *National Symposium on Organometallic Chemistry and Organic Synthesis: High lights and new Perspectives (OMCOS 2011),* March 28 - 29th, 2011, Department of Chemistry, North Eastern Hill University, Shillong.
11. Venkateswara Rao Anna and K. Mohan Rao. Novel Chelating Platinum Group Metal Complexes bearing Pyrimidyl-Methyl Imidazolyl [C, N] and Pyrimidyl-Methyl Imidazolyl Thione [N, S] dentate ligands: Syntheses, Spectral and Structural Characterization. 3rd Asian Conference on Coordination Chemistry (ACCC3) October 17th- 20th, 2011, New Delhi.
12. Sairem Gloria and K. Mohan Rao. ICSD 2011, Panjab University, Chandigarh, December 1-3, 2011.
13. S. L. Nongbri, Babulal Das and Kollipara Mohan Rao. Study of η6 and η5 - cyclic π-perimeter hydrocarbon water soluble platinum group metal complexes with pyridyl diketone analogues bonded through ĸ4-N∩O and ĸ3-N-C-N modes. MTIC XIV, December 10-13, 2011, School of Chemistry, University of Hyderabad, Hyderabad.
14. Mahesh Kalidasan, K. Mohan Rao**.** Mononuclear half sand-wich platinum group metal complexes containing dithiozoleligands: synthesis, spectral and molecular studies. Chemical Research Society of India, (CRSI-NSC 15), February 1-3rd, 2013, BHU, Varanasi.
15. Kaliyappan Ramesh Kumar, Akalesh Kumar Verma, Kollipara Mohan Rao. Arene ruthenium complexes containing Di(2-pyridyl) Ketone 2,4-Dinitrophenylhydrazone ligand: synthesis, molecular structure,anticancer activity against Ehrlich ascites carcinoma and molecular docking with cancer target proteins.  *International Conference on Biological Inorganic Chemistry (ICBIC-2013)*at the Department of Chemistry, Periyar University, Periyar Palkalai Nagar, Salem-636011, Tamil Nadu on 20th -22nd February 2013.
16. Narasinga Rao Palepu and Kollipara Mohan Rao. Synthesis, characterization and structural studies of h5 and h6- cyclic- pi-perimeter hydrocarbon complexes of Ru(II), Rh (III) and Ir (III) with three isomeric pyridine carbaldehyde picolinic hydrozone Schiff base ligands. MTIC XV, December 13-16, 2013, Department of Chemistry, IIT Roorkee.
17. S. Sanglipandi and Mohan Rao Kollipara. Synthesis and structural characterization of rhenium (I) metal complexes having bis(di 2-pyridylaminomethyl) benzene. MTIC XV, December 13-16, 2013, Department of Chemistry, IIT Roorkee.
18. *Narasinga Rao Palepua, S.L. Nongbria, J. Richard Premkumarb, Akalesh Kumar Vermac, Kaushik Bhattacharjeed, S.R. Joshid, Scott Forbese, Yurij Mozharivskyje, Romita Thounaojamf, K. Aguanf, Kollipara Mohan Rao.* Synthesis and evaluation of new salicylaldehyde-2-picolinylhydrazone Schiff base compounds of Ru(II), Rh(III) and Ir(III) as *in vitro* antitumor, antibacterial and fluorescence imaging agents. *13th Eurasia Conference on Chemical Sciences. IISc Bangalore December 14-18, 2014.*
19. Narasinga Rao Palepua, Sanjay Adhikaria, Werner Kaminskyb, G. P. A. Yapc, Kollipara Mohan Raoa\*. Synthesis and structural studies of arene Ru(II), Cp\*Rh(III) and Cp\*Ir(III) complexes with 2-pyridyloxime ligands. National Seminar on Newer Trends in Chemistry and Environment, Department of Chemistry, Don Bosco College. December 10-11th, 2014.
20. Sanjay Adhikari and Mohan Rao Kollipara\*. Study of bonding modes of di-2-pyridyl ketoxime ligand towards arene half sandwich metal compounds.

*Centre for Advanced Studies in Chemistry, North Eastern Hill University, Shillong 793022, India. Emerging trends in chemistry, March 28-29th, 2016.*

1. Sanjay Adhikari and Mohan Rao Kollipara\*. Arene ruthenium, Cp\*Rh and Cp\*Ir oximato and oxime complexes: Synthesis, structural, DFT and biological studies. Chemical Research Society of India, Feb. 3-5, 2017, Guwahati University, Guwahati.
2. *A. Basava Punna Raoa, Werner Kaminskyb and Kollipara Mohan Raoa\** Synthesis of platinum group metal complexes containing a polydentate ligand tris(dipyridylaminomethyl)benzene. *17th CRSI National Symposium in Chemistry* held from 6 - 8 February, 2015 at CSIR – National Chemical Laboratory, Pune, India.
3. *A. Basava Punna Rao1, Narasinga Rao Palepu1, A. Uma2, T. Chiranjeevi2, Werner Kaminsky3 and Kollipara Mohan Rao.* Syntheses and antibacterial evaluation of Cp\* Rhodium and Cp\* Iridium complexes. *“Exploring Recent Advances in Chemistry in Service for Mankind”* 30th – 31st July 2015 Organized by the Department of Chemistry, Shillong College, India.
4. *A. Basava Punna Rao* *and K. Mohan Rao.* Solvent effect on reaction of substituted pyrazoles with arene ruthenium metal complexes: synthesis and spectral characterization of bridge, mono and dinuclear compounds. *Emerging Trends in Chemistry (ETC-2016)* organized by Department of Chemistry, Center for Advanced Studies, North-Eastern Hill University, Shillong - 793022, March 28-29th, Meghalaya, India.
5. *A. Basava Punna Rao* *and K. Mohan Rao.* Influence of heterocyclic ring on bridging modes of quinoxaline based ligands towards half-sandwich d6 metal complexes. 2*1st CRSI National Symposium in Chemistry* held from 14 - 16 July, 2017 at CSIR – Indian Institute of Chemical Technology, Hyderabad, India.

**Member**:

**1. Member**: Life member in ***Chemical Research Society of India*** **2002**

**2. Member**: Life member in ***The Indian Science Congress Association 2009***

**3. Member**: ***American Chemical Society 1990-1993***

**4. Member**: ***Royal Society of Chemistry 1988-1990***

**COMPLETED Ph. D STUDENTS LIST**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S.No.** | **Name of Student** | **Degree Awarded** | **Title of Thesis** | **Co-Supervisors**  **(if any)** |
| 1 | *R. Lalrempuia* | *2004* | *Synthesis, characterization and reactivity studies of arene and cyclopentadienyl complexes of ruthenium(II) and osmium(II).* |  |
| 2 | *P. Govindaswamy* | *2005* | *Synthesis, Characterization and Reactivity Studies of Cyclopentadienyl and Arene Complexes of Some Platinum Group Metals.* |  |
| 3 | *Keisham Sarjit Singh* | *2005* | *Synthesis, characterization and reactivity studies of ruthenium(II) complexes containing penta- and hexa- hapto cyclichydrocarbons* |  |
| 4 | *K. Pachhunga* | *2007* | *Syntheses, spectral and structural studies of η5 and η6 cyclichydrocarbon complexes of some platinum group metals with n,n and o,o donor bidentate ligands* |  |
| 5 | *Evergreen K Rymmai* | *2008* | *Synthesis, characterization and reactivity studies of η5, η6-cyclichydrocarbon ruthenium(II) and hydrido ruthenium(II) carbonyl complexes with N-donor ligands* |  |
| 6 | *Prasant Circle* | *2003* |  | Co supervisor |
| 7 | *Thirumala Prasad Kota* | *2010* | *Synthesis and characterization of new Ruthenium(II), Rhodium(III) and Iridium(III) complexes containing tridentate and tetradentate N-bases.* |  |
| 8 | *Gajedra Gupta* | *2010* | *Syntheses and Structural Studies of Mono and Binuclear Complexes of some Transition Metals with N-based Tetradentate Ligands.* |  |
| 9 | *Venketeswara Rao Anna* | *2012* | *Syntheses and characterization of η5 and η6- cyclic hydrocarbon complexes of some platinum group metals containing Nheterocyclic carbenes as ligands.* |  |
| 10 | *Ms. Saphidabha Lyngdoh Nongbri* | *2012* | *Syntheses and Study of η5- and η6-Cyclic-hydrocarbon Complexes of some Platinum Group Metals with O, Oand N, O- Donor Ligands* |  |
| 11 | *Sairem Gloria* | *2013* | Syntheses and Spectral Analyses of Some Platinum Group Metal Complexes with Multidentate Nitrogen Donor Ligands |  |
| 12 | *K Mahesh* | *2015* | Synthesis and study of transition metal complexes containing arenes and multidentate nitrogen donor ligands |  |
| 13 | *Sanglipandi* | *2016* | *Syntheses and structural studies of rhenium and platinum group metal complexes containing nitrogen bases* |  |
| 14 | *Narasinga Rao Palepu* | *2016* | *Synthesis and spectral studies of complexes of platinum group metals bearing ɳ5- and ɳ6-cyclic hydrocarbons and multidentate nitrogen donor ligands* |  |
| 15 | *A. Basava Punna Rao* | *2018* | Synthesis and spectral studies of platinum group metal complexes comprising ɳ5- and ɳ6-cyclic π- perimeter hydrocarbons with multidentate nitrogen donor ligands |  |
| 16 | Sanjay Adhikari | 2018 | Synthesis and spectral studies of some transition metal complexes containing η5- and η6- cyclic hydrocarbons and N,N’, N,O and NS donor ligands |  |
| 17 | Agreeda lapasam |  | Synthesis, structural and biological studies of complexes of platinum group metals containing N∩N, N∩O, N∩S and O∩S donor ligands |  |
| 18 | Lathewdeipor Shadap |  | Platinum group metal complexes containing nitrogen and sulfur donor ligands: Synthesis and biological activity studies |  |

**COMPLETED PROJECTS**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sl No** | **Name of the Agency** | **Year (Started-completed)** | **Total (Rs)** | | **Title of the project** | | **Equipment /**  **Infrastructural facilities** | | **Number of publications** | | |
| 1 | DST | SERC DST  Project No. SR/  S1/ IC - 11/ 2004  COMPLETED | | Rs.16,53,600 | | “Syntheses, reactivity and structural studies of complexes of Ruthenium and Osmium containing η5 and η6-Cyclichyrocarbons” | | Minor equipment like low temp. circulator, small microscope, aspirator *etc*., | | **15** |
| 2 | DST | SERC DST  Project No.  SP/S1/F22/98  COMPLETED | | Rs. 8,94,620 | | ‘Synthetic and structural studies on (η5-cyclopentadienyl and azacyclopentadienyl) ruthenium (II) bisphosphine complexes’ | | Minor equipment like Vacuum pump, Balance, Stirrers, mantles *etc*., | | **10** |
| 3 | CSIR | No.01(2493)/11/EMR-II  COMPLETED | |  | | Syntheses, Reactivity and Structural Studies of Platinum group metal complexes containing η5 and η6 – cyclichydrocarbons and multidentate nitrogen bases” | | Buchi Rota evaporator, computer and Low tep. unit | | **5** |
| 4 | UGC | F.No.39-793/2010(SR)  COMPLETED | |  | | New synthetic aspects and catalytic study of late transition metal complexes bearing homo and hetero-scorpionates and n-heterocyclic carbenes as ligands | | Melting point appratus | | **5** |

PRESENT WORK

Metals of the platinum group *viz*. ruthenium (Ru), rhodium (Rh), palladium (Pd), osmium (Os), iridium (Ir), and platinum (Pt) have been reported to have wide applications in the biological field, catalysis and supramolecular chemistry. With the discovery of cisplatin and its remarkable anticancer activity, the platinum group d6 metal complexes have undoubtedly raised considerable potentials for the treatment of cancer. Metal complexes of ruthenium(II), rhodium(III) and iridium(III) have been reported to inhibit tumors by their selective interactions towards the biomolecules. Their applications in the biological field also extended towards antibacterial, antimalarial and antimicrobial activities. The profound utilization of the platinum group metals and their complexes as catalysts is their ability to catalyze reactions under milder conditions which produce a higher selectivity as compared to other metals, their stability in various oxidation states, functional-group tolerance.

In our laboratory we will do the synthesis of arene ruthenium, Cp\* rhodium and Cp\* iridium complexes with various nitrogen, oxygen and sulfur donor ligands. The complexes were characterized by spectroscopic and crystallographic techniques. These complexes as well as their respective ligands were studied for antibacterial studies, anticancer and antioxidant activity studies.



Scheme: Precursor metal complexes

These systems are isoelectronic and behave similarly in their chemical reactions. All these complexes undergo substitution reactions.