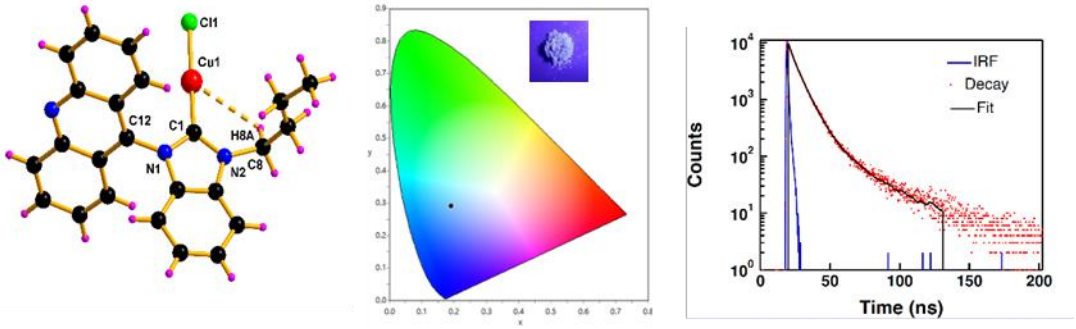
Light Emitting Copper(I) N-Heterocyclic Carbene Molecule: Synthesis and its photophysical properties

Gopendra Muduli and Ganesan Prabusankar
Department of Chemistry, Indian Institute of Technology Hyderabad India-502 285
E-Mail: cy21resch11005@iith.ac.in, E-Mail: prabu@chy.iith.ac.in

Neutral heteroleptic copper(I) complex have been studied in many fields of catalysis, material science, and medicinal field. The solid-state structure of N-heterocyclic carbene (NHC) complex has attracted the world because of its luminescent materials. The photophysical properties can be tuned by substitution on NHC, metal coordination number, metal-metal interaction, π–π interactions, and metal hydrogenbonding. The crystalline packing in solid state can show the emission in the desired colour range through additional aggregation-induced emission.[1-4] The N-substituted NHC mononuclear copper(I) complex are generally challenging. A new NHC ligand was prepared having a substitution of acridine and butyl chain through multistep synthesis and its complex with copper(I) with neutral mononuclear coordination was isolated and fully characterized by spectroscopic techniques as well as X-ray crystallography. The structural properties of metal-hydrogen bonding and photophysical properties were studied. The blue-emitting copper(I) complex having a lifetime of nanoseconds can be further studied for its wider application in white OLED fabrication.



1) M. Vaddamanu, A. Sathyanarayana, Y. Masaya, S. Sugiyama, O. Kazuhisa, K. Velappan, K. Subramaniyam, K. Hisano, O. Tsutsumi, G. Prabusankar, *Organometallics*, **2020,** *39(12)*, 2202.
2) M. Vaddamanu, A. Sathyanarayana, Y. Masaya, S. Sugiyama, O. Kazuhisa, K. Velappan, M. Nandeshwar, K. Hisano, O. Tsutsumi, G. Prabusankar, *Chem. Asian J.*, **2021**, *16(5)*, 521.
3) M. Adinarayana, M. Vaddamanu, A. Sathyanarayana, K. Siddhant, S. Sugiyama, O. Kazuhisa, A.K. Rengan, Kavitha Velappan, Kyohei Hisano, Osamu Tsutsumi and G. Prabusankar, *Dalton Trans.*, **2021**, *50*, 16514.
4) S. Kalaivanan, M. Vaddamanu, K. Siddhant, K. Velappan, K. Hisano, O. Tsutsumi, and G. Prabusankar, *New J. Chem.*, **2022,** *47*, 491.