

C. EUGENE BENNETT
DEPARTMENT OF CHEMISTRY

Exploring the synthesis and application of various Cu(I)-NHC complexes in chemical catalysis and light emission

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Our research is focused on investigating the under-explored properties of copper complexes containing mono- and poly-NHC platforms and their use in chemical bond activation reactions. We have developed pyridyl- and pyridylmethyl-linked Cu(I)-bis(NHC) complexes bearing electron-donating and electron-withdrawing wingtips, some of which can serve as catalysts in the Sonogashira-type and Ullmann-type cross-coupling reactions. Unlike other Cu(I) catalysts that require an inert atmosphere for an efficient performance, the Cu-CNC complexes provide good to excellent yields of the cross-coupled products in air. Mechanistic studies have confirmed the involvement of {Cu-O2} adducts and dearomatized Cu-NHC complexes in the reaction. Furthermore, some of the Cu-CNC complex have shown promising reactivity towards reducing CO₂ to formate under electrochemical conditions and direct carboxylation of terminal alkynes under ambient conditions. Recently, we have shown that the electronic properties of the pincer NHC ligands can be altered modularly through the aryl wingtips controlling the geometry and Cu nuclearity in the Cu-NHC complexes.

Students, meet the speaker after the seminar in a student/postdoc session from 4:45-5:15 pm

Date: Fri, Feb 10, 2023

Time: 3:30-4:30 pm

Location: Clark Hall 112