

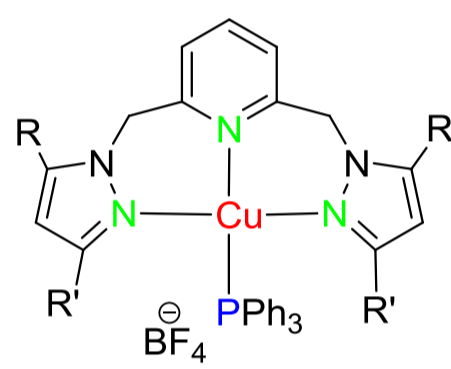
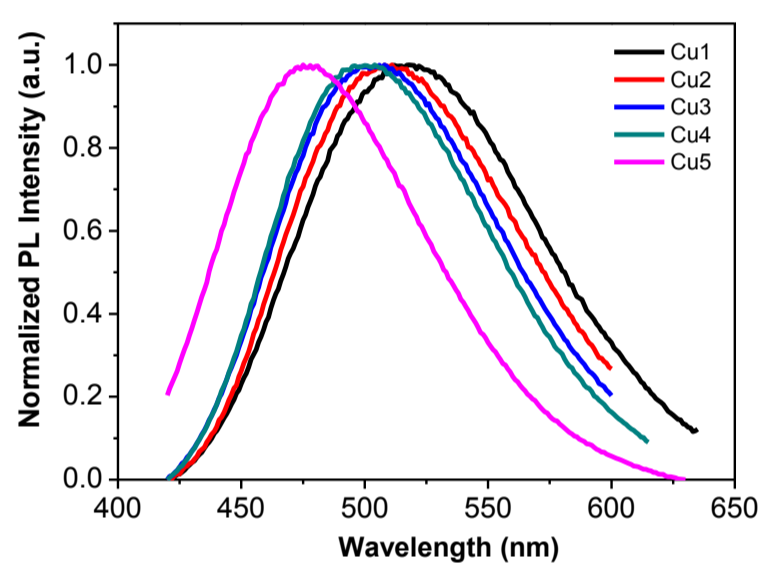
Metal-Containing Materials for Energy Conversion and Biological Applications



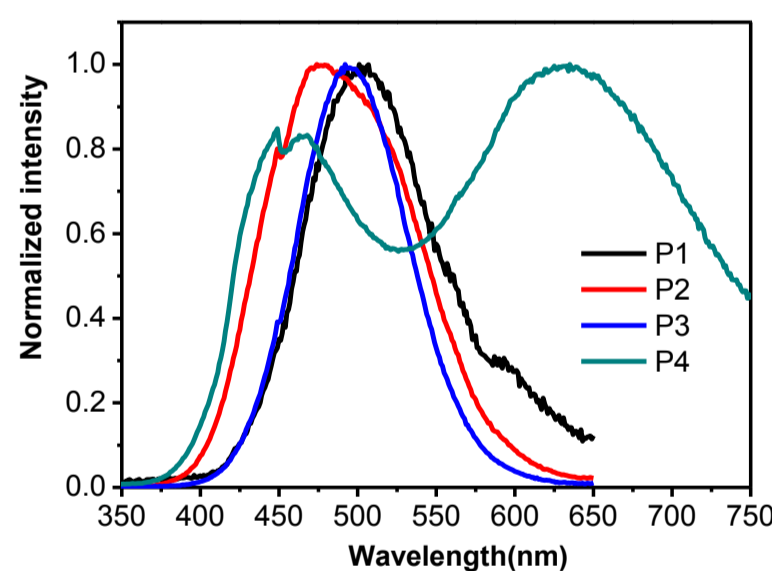
Dr. Xunjin Zhu

Copper(I)-based Phosphorescent Materials

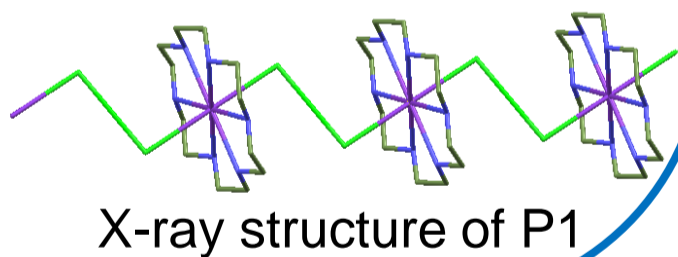
To maximize the energy-saving benefit, screen makers select OLED materials that most efficiently convert electrical current into light, a property known as high external quantum efficiency (EQE). Some of the best materials are phosphorescent metal complexes, but these are typically composed of rare and expensive metals such as iridium. Copper complexes have long been known as potential alternatives, and would cost 1/2,000th that of iridium phosphors. Herein, our goal is to make red-, green-, and blue-colored phosphorescent copper materials and apply them in working devices.



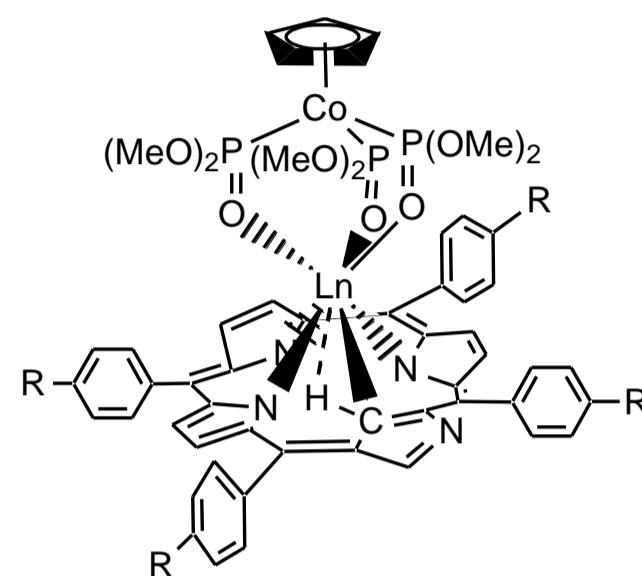
Cu1: R=H, R'=H
Cu2: R=CH₃, R'=CH₃
Cu3: R=CH(CH₃)₂, R'=CH(CH₃)₂
Cu4: R=Ph, R'=Ph
Cu5: R=CF₃, R'=CH₃



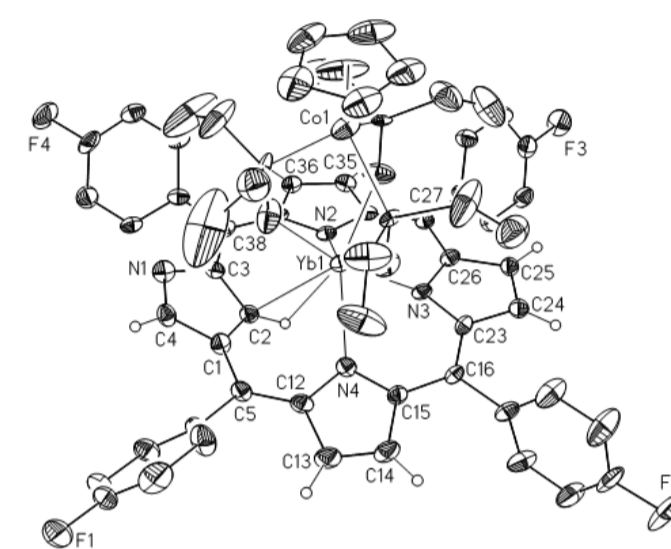
P1-P4 represent a series of coordination polymers containing copper halide and functionalized crown ether units.



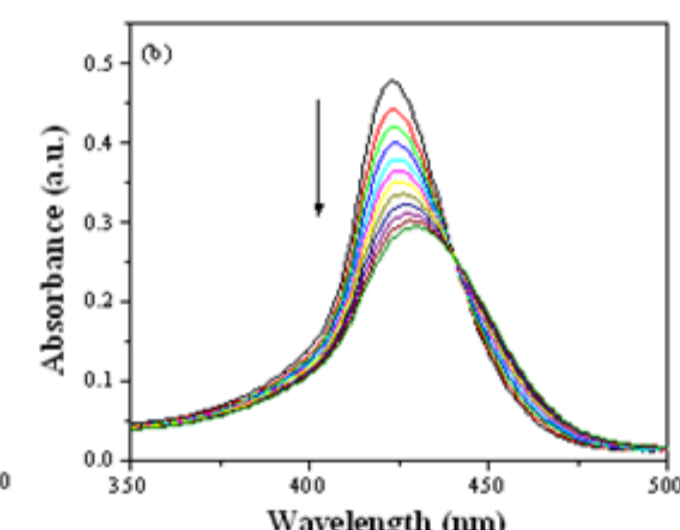
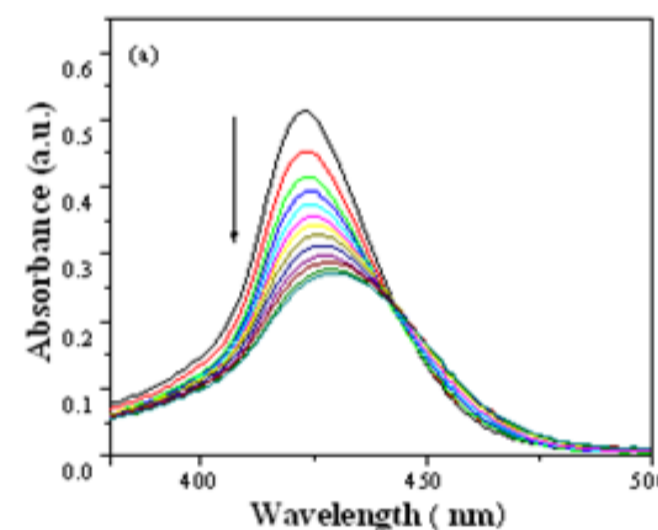
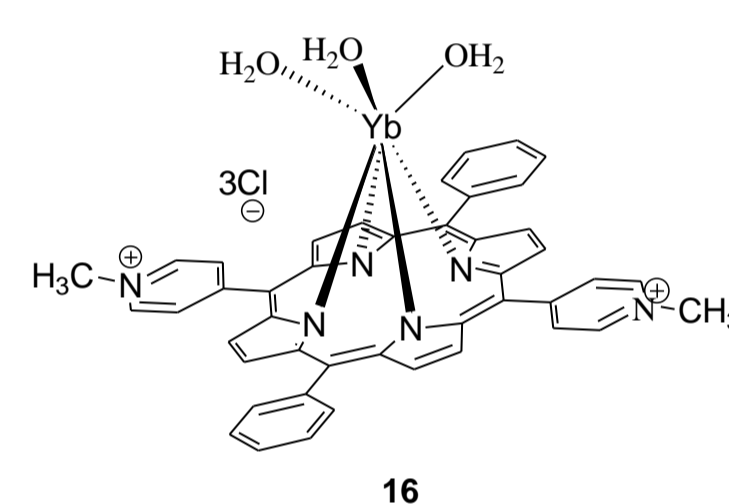
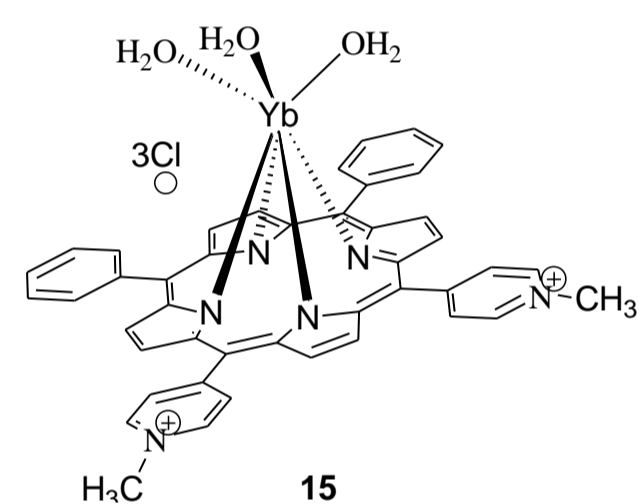
Near-Infrared Luminescent Ln(III) Complexes and their biological applications



Ln = Yb, Er; R = H, CH₃, F, CN, C≡C-SiMe₃

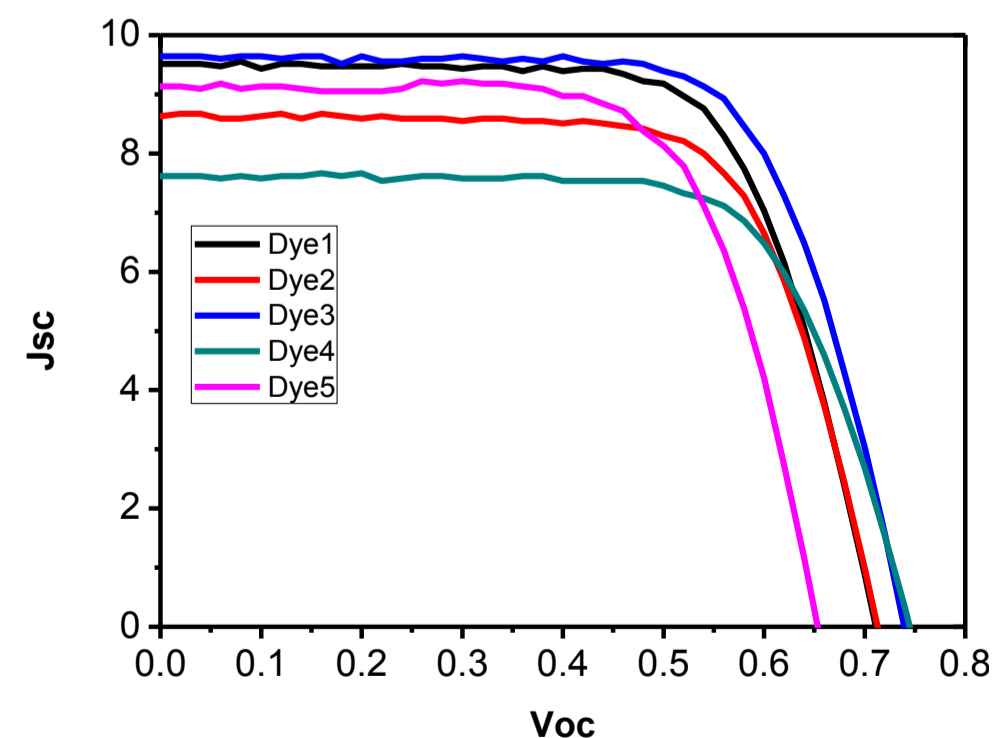
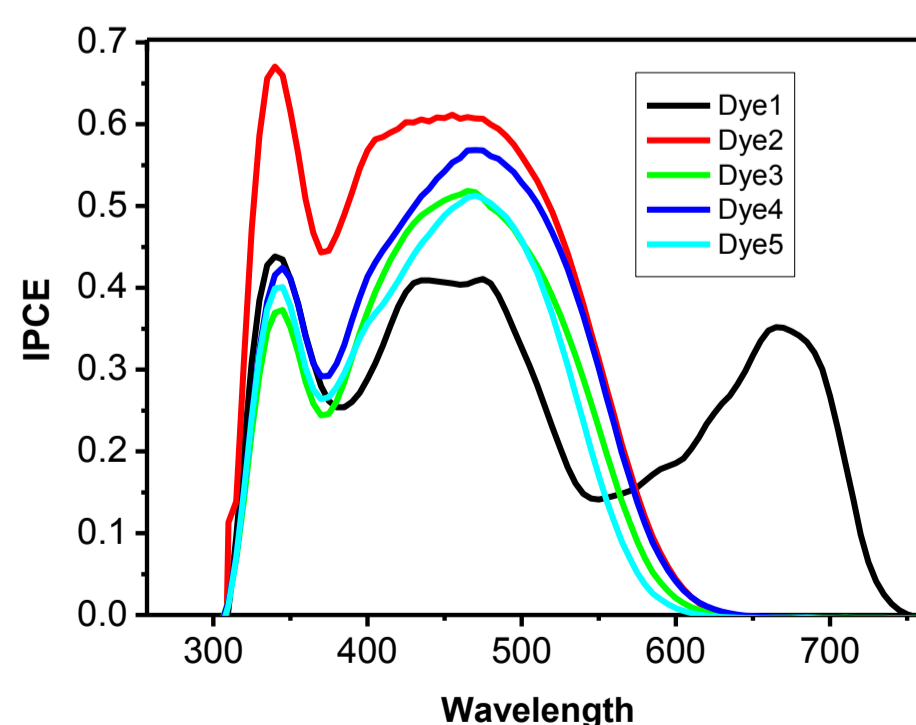
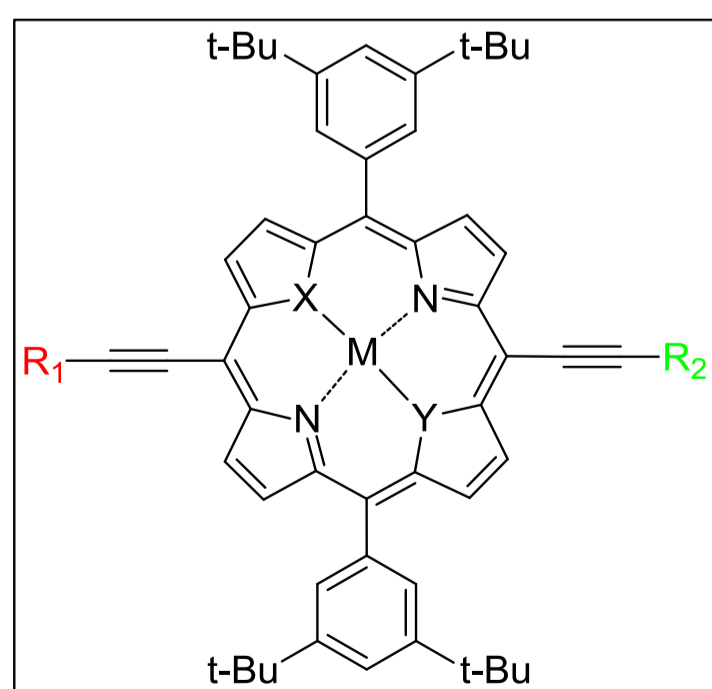


(NCP)Yb(LOMe)



Absorption spectra (a) and (b), of **15** in the presence of increasing concentrations of poly(dG-dC)₂ and poly(dA-dT)₂, respectively.

Porphyrin-Based Dyes for Dye Sensitized Solar Cells



Reference

- J. Zhang, F. Zhao, X. Zhu, W. K. Wong, W. Y. Wong, D. Ma, "New phosphorescent platinum(II) Schiff base complexes for PHOLED applications", *J. Mater. Chem.*, **2012**, 22, 16448–16457.
- T. Zhang, X. Zhu, C. C.W. Cheng, W.-M. Kwok, H. L. Tam, J. Hao, D. W. J. Kwong, W.-K. Wong, K.-L. Wong, "Water-soluble mitochondria-specific ytterbium complex with impressive NIR emission", *J. Am. Chem. Soc.* **2011**, 133, 20120-20122.