

CHIRAL CARBENES FOR CHIRAL PHOTOLUMINESCENT MATERIALS

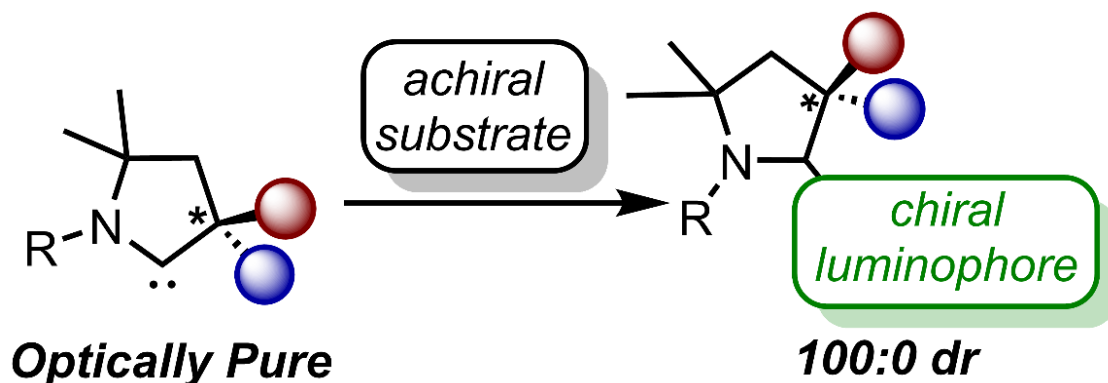


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Circularly polarized (CP) light has attracted increasing interest as a key component of next-generation computing, lighting display, and medical imaging technologies. However, the design and synthesis of materials which efficiently generate CP light remains a standing challenge. Chiral lanthanide complexes boast some of the highest photoluminescence dissymmetry factors but suffer from intrinsically weak emission. While intrinsically chiral organic emitters, such as carbohelices, can exhibit stronger emission, they usually feature lower dissymmetry factors.¹

Previously, our group and others have shown that the amphiphilic character of (cyclic)(alkyl)(amino)carbenes (CAACs) enables them to undergo oxidative addition to a wide range of enthalpically strong E-H bonds.² We have recently observed that chiral CAACs can exhibit highly diastereoselective oxidative addition to such bonds, enabling the preparation of novel, propeller-like molecules.³ Due to the unique steric profile of the CAAC moiety, these propellers are endowed with remarkable chiroptical properties despite undergoing facile stereoisomerization. Altogether, this suggests that chiral singlet carbenes are privileged tools for controlling the formation and dynamic behavior of stereogenic elements. Herein, we expand upon this theme for the development of new chiroptically active materials.



References

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