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Title:	Visible light photoredox by a (ph,ArNacNac)2Zn photocatalyst: photophysical properties and mechanistic understanding
Authors:	Singh, Kirti (/jspui/browse?type=author&value=Singh%2C+Kirti) S., Vidhyalakshmi (/jspui/browse?type=author&value=S.%2C+Vidhyalakshmi) Adhikari, Debashis (/jspui/browse?type=author&value=Adhikari%2C+Debashis)
Keywords:	photocatalyst photoredox
Issue Date:	2021
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Citation:	Inorganic Chemistry Frontiers, 8(8), 2078–2087.
Abstract:	A class of potent zinc-based photocatalysts have been developed in this report, whose reducing properties are dependent on the ligand redox of the beta-diketiminate backbone. Two molecules have been crystallographically characterized to reveal that zinc is trapped in a tetrahedral environment posed by two beta-diketiminate backbones. Upon excitation with blue light, the molecules generate a relatively long-lived excited state in the range of ∼12 nanoseconds as determined by a time-correlated single photon counting experiment. The long-lived excited state is reductively quenched by an amine and the reduction is a ligand-based process. Stern–Volmer quenching kinetics was performed to find a linear correlation of the reduced fluorescence intensity with increasing quencher concentration that suggests a dynamic quenching process. Under photochemical conditions, the radical anion of the zinc complex transfers a single electron to break a C–Br bond and conducts atom transfer radical addition (ATRA) type reactions. Leveraging on the single electron transfer from the reduced backbone further, a Meerwein arylation reaction has also been developed. A plausible mechanistic pathway has been delineated for ATRA reactions, depending on the gathered evidence and appropriate intermediate isolation.
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