Electronic Supporting Information:

Energy Transfer Catalysis Mediated by Visible Light: Principles, Applications, Directions

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This document aims to provide the readers additional literature background on selected aspects and topics raised throughout the tutorial review.

Visible-Light-Mediated Photo(redox) Catalysis

The following reviews provide a broad overview of the fundamentals as well as the applications of visible-light-mediated photoredox catalysis strategies in organic synthesis.


Fundamentals of Triplet-Triplet Energy Transfer

Mechanistic details on triplet-triplet energy transfer processes are well summarized in different photochemistry textbooks, as referenced in the main article (e.g. references 12 and 18). Details on spectroscopic techniques for analysis and characterization of triplet-triplet energy transfer processes can be inferred from the following literature references:


The sensitivity of the observed energy transfer rate to steric shielding of either substrate or catalyst was first described by Hammond and coworkers in 1966. A recent example of this phenomenon applied to organic synthesis was reported by Weaver and coworkers in 2016.

Commonly Applied Photosensitizers

First reports of organic molecules applied as photosensitizers in the context of organic synthesis originate from the 1950s and 1960s. Their investigation and spectroscopic characterization was focused in the following decade, as reported by Hammond and coworkers.


[Ru(bpy)]$_3^{2+}$ and related ruthenium-based sensitizers have been established since the 1970s. Thus, their characterization and properties were reviewed extensively.


The most commonly applied iridium-based photosensitizers were published in the context of light-emitting devices between 2000 and 2005.


Fundamentals of Triplet-Triplet Energy Transfer

The following references represent further impressive examples of energy-transfer-enabled [2+2]-cycloadditions applied to organic synthesis:

Double bond isomerization processes have been discovered and investigated since the early 1960s. Initial reports by Hammond and coworkers, along with detailed mechanistic analysis, were followed by various applications in organic synthesis.


The sensitization of transition metal complexes by means of triplet-triplet energy transfer has emerged as a powerful strategy in the last few years. The underlying mechanisms are subject of current research and have been focused extensively, e. g. by Doyle and coworkers.