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Advances in Contemporary Research

Visible-light photocatalyzed radical multicomponent reactions in organic synthesis: A short review

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This review presents recent advancements in multicomponent reactions driven by visible light photocatalysis, encompassing both metal-free and transition-metal-catalyzed strategies. It explores current challenges, promising opportunities, future directions, and real-world applications in the visible-light-mediated synthesis of organic and bioactive molecules. Practical aspects including room-temperature protocols, continuous-flow synthesis, and scalable green methodologies are discussed. By unifying these transformations under a mechanistic framework, this review provides a comprehensive and methodology-centered perspective, complementing recent heterocycle-focused reviews. Finally, this work aims to propel further innovation in photocatalytic methodologies for constructing valuable organic frameworks.

Keywords: Visible light, Multicomponent reactions, Photoinduced process, Sustainable operation