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Visible Light and Triselenium Dicyanide (TSD): New Horizons in the Selenocyanation of Enamino Compounds

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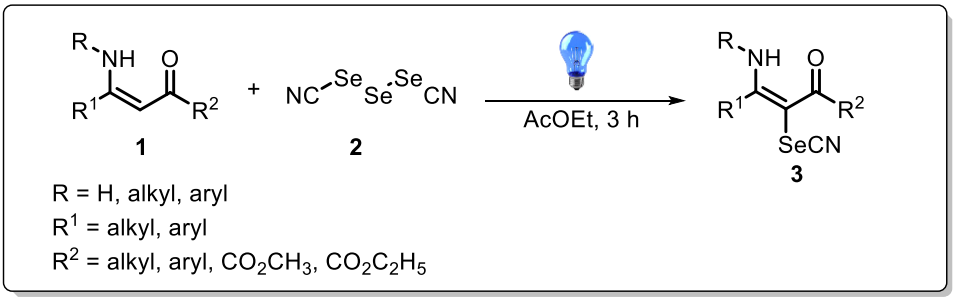
ABSTRACT

Enaminones or enamino esters, containing an amino group linked by a carbon-carbon double bond to a carbonyl or ester, are valuable synthons due to their amphiphilic nature.[1] Visible light photocatalysis has revolutionized synthetic transformations by offering environmentally friendly and manageable processes that align with green chemistry principles. This technique facilitates the chemical transformation of enaminones, enabling efficient production of organic compounds and the construction of Se-based structures. The chemistry of organoselenium compounds has advanced significantly, particularly due to their notable biological activities. Organoselenium derivatives, especially selenocyanate compounds, are key intermediates in organic synthesis due to selenium's unique reactivity. Potassium selenocyanate (KSeCN) is commonly used but presents operational challenges due to its sensitivity to humidity and tendency to decompose. Alternatively, triselenium dicyanide (TSD) serves as an electrophilic and radical selenocyanate source, providing smoother access than KSeCN and facilitating the conversion of intermediates into selenium-containing systems via C≡N bond. From a pharmaceutical standpoint, enamino selenocyanate compounds hold promise as bioactive compounds through molecular hybridization, though they remain largely unexplored. The advancements in visible light photocatalysis and organoselenium chemistry pave the way for innovative and sustainable approaches in organic synthesis.[2] In this way, we developed a novel method for the synthesis of enamino compounds containing a selenocyanates moiety by reacting triselenium dicyanide (TSD) and enaminone/enaminoesters under blue light irradiation. The reactions are triggered by the formation of Se-centered radical species, followed by the addition enamino π-bond.



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