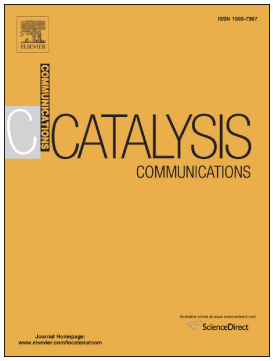

Visible-light-photoredox catalytic C-C, C-N bond formation: Synthesis of pyrazole derivatives via radical ions

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Visible-Light-Photoredox catalytic C-C, C-N bond formation: Synthesis of Pyrazole Derivatives via radical ions

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Abstract: A new approach for 5-amino-pyrazole-4-carbonitriles has been developed employing visible light photoredox catalysis. The green attributes of our work exploit on the utilization of visible light and Eosin Y organo photocatalyst as inexpensive, non-toxic, readily-available and eco-compatible reagents. In this strategy atmospheric O2 served as an economical and eco sustainable desulfurizing agent, efficiently promotes the formation of C-C and C-N bonds in a simple one-pot operation under mild conditions thus increase the efficiency of proposed protocol.

Keywords: Atmospheric oxygen; Photoredox catalysis; Visible light; Sulfur radical.

In recent years, visible-light mediated photoredox catalysis are proving to be a powerful tools of chemical transformations because of its low cost, cleanness, easily handled, environmental benignness and almost infinite availability as a source of energy[1]. However inability of most organic compounds to absorb the light in visible region motivates towards the use of photocatalysts to induce visible-light-driven reactions[2]. Among them organometallic complexes such as $Ru(bpy)_3^{2+}$ and $Ir(ppy)_2(dtbbpy)^+$ are exclusively exploited[3,4] and widely utilized in numerous photochemical[5,6] . However high cost, potential toxicity, limited availability and difficulty to remove especially in the pharmaceutical and agrochemical industries are disadvantages of these photocatalyst. Recently, organic dyes which are commercially available, inexpensive, eco-friendly and easy to handle provide a superior alternative to transition-metal photocatalysts and attracted considerable interest from the synthetic community[7]. The use of