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| **International Conference on Chemistry for Human Development (ICCHD-2025)**  **Date: 4th-6th January, 2025, Venue: Science College, Calcutta University, Kolkata**   |  | | --- | |  |   Abstract  Low Energy Light-Driven Unorthodox Catalysis Processes  Ramij R. Mondal, Debasish Ghosh, Saikat Khamarui and Dilip K. Maiti\* Department of Chemistry, University of Calcutta, 92 A. P. C. Road, Kolkata-700009, INDIA e-mail: dkmchem@caluniv.ac.in  Visible light assisted photoredox catalysis1a such as oxidation of alcohols,1b α-haloesters,1c arylboronic acids,1d has gain much interest for the activation of organic molecules during last few years. Generally, transition metal-ligand complexes are more effective photocatalysts for proton-coupled electron transfer depending on their E0 values.1e Organic dyes such as Eyosin Y and Rose Bengal are more attracting as a sustainable light absorbers for visible light driven catalytic organic transformations. Technological progress and broad commercial availability of light-emitting diodes that are able to provide high-intensity visible light in a narrow wavelength range for all colors have made ideal cheap and energy-efficient light sources available for photocatalysis. So far, the visible-light photocatalytic reactions are exploited for radical transformations.1f For general and industrial application of photocatalysis we should figure out simple processes which will follow ionic, carbene and nitrene mechanisms.  Recently we found the activation of λ3-hypervalent iodine under blue LED light and established an unorthodox stereoselective cyclization strategy for synthesis of functionalized diaziridines via C-C cleavage and subsequent grafting of methylene analogues with aliphatic amines using Rose Bengal. sp3C-H activation with multi N-C/C-C coupling under the non-metallic conditions led us to achieve tetrahydropyrimidine derivatives. A metal-light dual catalysis for simultaneous C-C cleavage and C-N coupling discovered for the direct synthesis of α-ketoamides and α-ketoesters using a combination of Cu(I)-Eosin Y.  (a) C. K. Prier, D. A. Rankic, D. W. C. Macmillan, *Chem. Rev.* **2013**, *113*, 5322; (b) H. Cano-Yelo, A. Deronzier, *Tetrahedron Lett.* **1984**, *25*, 5517; (c) Y. Su, L. Zhang, N. Jiao, *Org. Lett.* **2011**, *13*, 2168; (d) Y.-Q. Zou, J.-R. Chen, X.-P. Liu, L.-Q. Lu, R. L. Davis, K. A. Jørgensen, W.-J. Xiao, *Angew. Chem., Int. Ed.* **2012**, *51*, 784; (e) A. Noble, S. J. McCarver, D. W. C. MacMillan, *J. Am. Chem. Soc.* **2015**, *137*, 624; (f) S. Roslin, L. R. Odell, *Eur. J. Org. Chem.* **2017**, 1993. |