

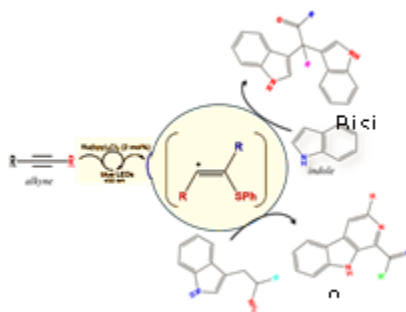
Photo redox catalysed organic synthesis: Bisindoles and β -Carbolines

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Abstract: The photo redoxcatalysts have been widely investigated and are used to catalyse many photo induced reaction with different inorganic and organic *photosensitizers*. The photo induced reaction or synthesis involves the oxidation/reduction of the substrate through electron transfer. The low energy visible-light-activated photo catalysts like Ru, Ir, etc. are very energetic in the field of organic synthesis. Ruthenium complex was used as a photo catalyst for the production of carboline and the bisindole in visible light; reactants were used in different ratios to obtain different derivatives of carbolines and bisindoles. Reaction between alkyne and indole in presence of thiophenol, trifluoroacetic acid and ruthenium complex irradiating in blue LED(450nm) lead to the formation of **1,1**-Di(1H-indol-3-yl)octan-2-one(carbolines). Reaction viability with different phenylacetylenes and indoles was also studied. The reaction of phenylacetylene, 4-Floro, 4-Methoxy and 4-alkyl-substituted (tert-butyl, ethyl and methyl) phenylacetylene proceeded in a simpilistic manner to give different derivatives of carbolines with good yields. To access cores of almost all the monoterpeneindole alkaloids the Pictet-Spengler reaction of tryptamines was applied. In presence of photo catalyst the reaction of tryptamine with cyclopropyl acetylene led to the formation of dihydro- β -carboline as exclusive product in 65% yield. The cross-coupling reaction between two different indoles was also studied which lead to formation of different derivatives of bisindoles. The reaction of phenylacetylene with 2-methylindole and indole/5-flouro/5-bromo indole led to asymmetrical products in 34-41% yields accompanying self-coupled product (*2,2-Bis(2-methyl-1H-indol-3-yl)-1-phenylethan-1-one*) and monohydroxyindole product as side products.



Scheme of reaction

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