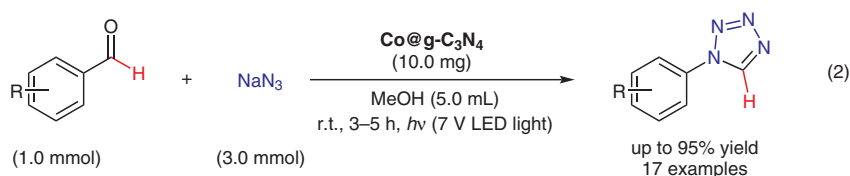
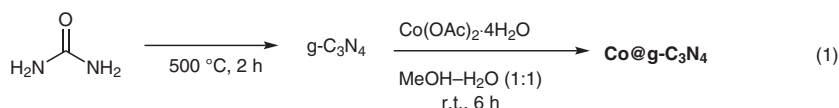


F. VERMA, A. SAHU, P. K. SINGH, A. RAI, M. SINGH, V. K. RAI* (GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR AND JAWAHARLAL NEHRU UNIVERSITY, NEW DELHI, INDIA)

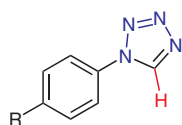
Visible-Light Driven Regioselective Synthesis of 1*H*-Tetrazoles from Aldehydes through Isocyanide-Based [3+2] Cycloaddition

Green Chem. **2018**, *20*, 3783–3789.

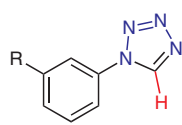
Cobalt-Catalyzed Regioselective Photochemical Synthesis of 1*H*-Tetrazoles



Results:

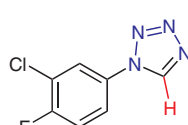


R = Cl, 92% yield
R = Br, 93% yield
R = NO₂, 95% yield

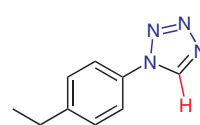


R = Me, 88% yield
R = OMe, 87% yield
R = Ac, 90% yield
R = H, 89% yield

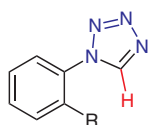
R = Cl, 89% yield
R = Me, 87% yield



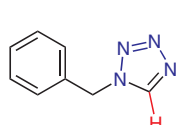
87% yield



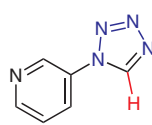
85% yield



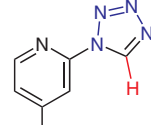
R = Cl, 90% yield
R = Me, 88% yield



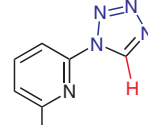
89% yield



86% yield



85% yield



84% yield

Significance: A cobalt-doped polymeric graphitic carbon nitride catalyst (Co@g-C₃N₄) was prepared by calcination of urea followed by treatment with Co(OAc)₂·4H₂O in aqueous methanol (eq. 1). Co@g-C₃N₄ catalyzed the reaction of aldehydes with sodium azide under visible-light irradiation and air to give the corresponding 5-substituted 1*H*-tetrazoles in up to 95% yield (eq. 2). The authors propose an isocyanide intermediate, formed through a Co@g-C₃N₄-induced photocatalytic 1,2-phenyl migration from C to N.

Comment: Co@g-C₃N₄ was characterized by means of SEM, XPS, XRD, FTIR, UV-Vis, EDX, TEM, and photoluminescence analyses. In the reaction of 4-chlorobenzaldehyde with sodium azide, the catalyst was recovered by filtration and reused four times without significant loss of its catalytic activity.

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Category

Polymer-Supported Synthesis

Key words

cobalt catalysis

photocatalysis

tetrazoles

graphitic carbon nitride

aldehydes

cycloaddition

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