Cobalt-Catalyzed Regioselective Photochemical Synthesis of 1H-Tetrazoles

**Significance:** A cobalt-doped polymeric graphitic carbon nitride catalyst (Co@g-C_3N_4) was prepared by calcination of urea followed by treatment with Co(OAc)_2·4H_2O in aqueous methanol (eq. 1). Co@g-C_3N_4 catalyzed the reaction of aldehydes with sodium azide under visible-light irradiation and air to give the corresponding 5-substituted 1H-tetrazoles in up to 95% yield (eq. 2). The authors propose an isocyanide intermediate, formed through a Co@g-C_3N_4-induced photocatalytic 1,2-phenyl migration from C to N.

**Comment:** Co@g-C_3N_4 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.

**Results:**

R = Cl, 92% yield  
R = Br, 93% yield  
R = NO_2, 95% yield

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

87% yield  
85% yield

89% yield  
86% yield  
85% yield  
84% yield

**Key words**
- cobalt catalysis
- photocatalysis
- tetrazoles
- graphitic carbon nitride
- aldehydes
- cycloaddition