Visible-Light-Mediated [4+2] Annulation of *N*-Cyclobutylanilines on Self-Doped Titania

Category

Polymer-Supported Synthesis

Key words

heterogeneous catalysis

titanium catalysis

photocatalysis

annulation

cyclobutylanilines

alkynes

Preparation of catalyst:

[4+2] annulation:

Selected results:

Comparison with rose bengal:

Significance: A self-doped $\text{Ti}^{3+}@ \text{TiO}_2$ catalyst was prepared as shown in equation 1. The [4+2] annulation of *N*-cyclobutylanilines with alkynes took place in the presence of $\text{Ti}^{3+}@ \text{TiO}_2$ under visible-light irradiation in air to give the corresponding annulation products **1a–d** in up to 85% yield (eq. 2; 15 examples).

Comment: The catalyst was recovered by centrifugation, washed with *t*-BuOH, and reused four times for the formation of **1a** (fifth run: 79% yield). When the reaction of 4-*t*-butyl-*N*-cyclobutylaniline and prop-1-yn-1-ylbenzene was carried out in the presence of $\text{Ti}^{3+}@ \text{TiO}_2$ (10 mol%) or rose bengal (5 mol%) for 13 h, product **2** was obtained in yields of 43% and 19%, respectively (eq. 3).

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