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Photocatalytic Hydromethylation and Hydroalkylation of Olefins Enabled by Titanium Dioxide Mediated Decarboxylation
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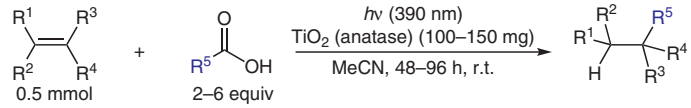
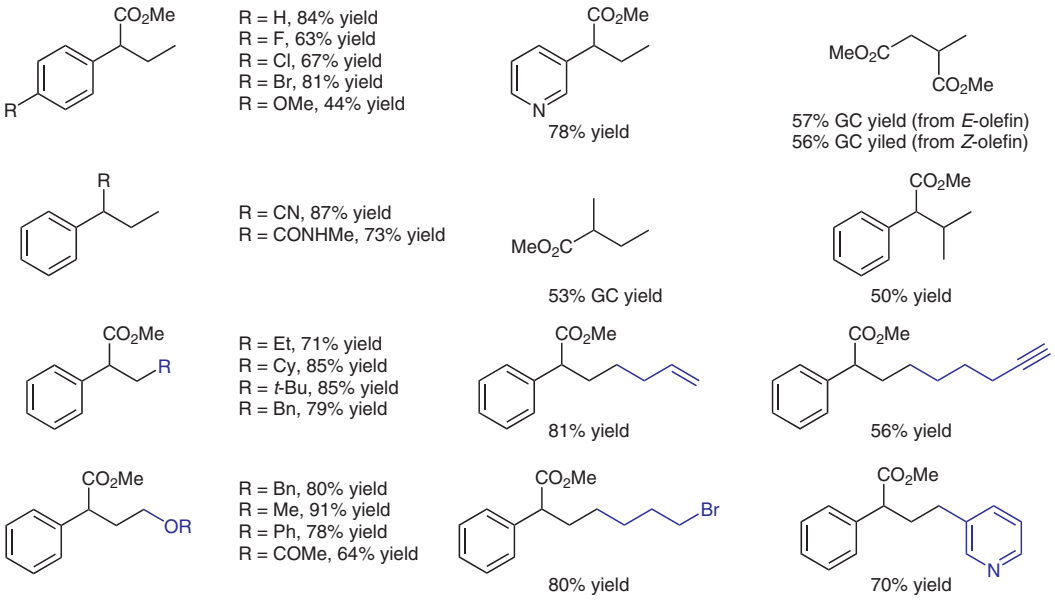
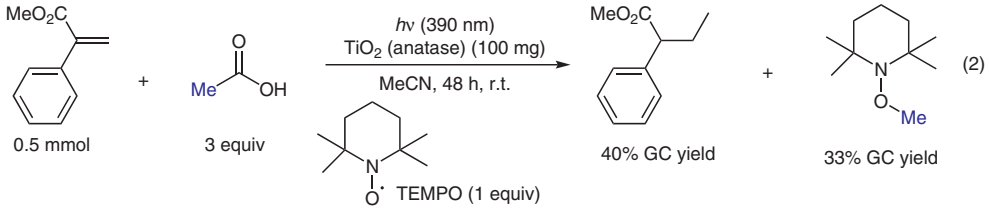
Titania-Promoted Hydroalkylation of Electron-Deficient Olefins



Selected examples:



Mechanistic experiment:



Significance: Commercially available anatase TiO_2 nanoparticles promoted the hydroalkylation of alkenes bearing electron-withdrawing groups with carboxylic acids under 390 nm light irradiation to give the corresponding hydrocarbons in up to 91% yield (eq. 1).

Comment: Mechanistic studies indicated that alkyl radicals were generated by decarboxylation of the carboxylic acids promoted by TiO_2 (eq. 2). The catalytic activity of TiO_2 was superior to that of various heterogeneous semiconducting photocatalysts such as ZnO, WO_3, or CdS.

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Category
Polymer-Supported Synthesis

Key words
titanium dioxide catalysis
photocatalysis
hydroalkylation
alkenes

Synfact of the Month