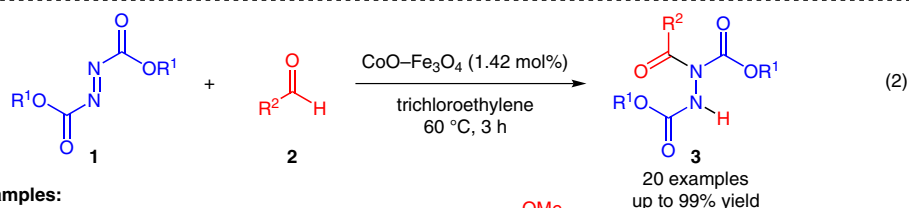
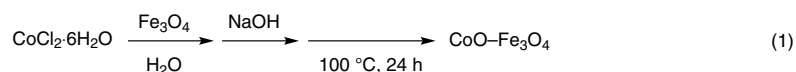


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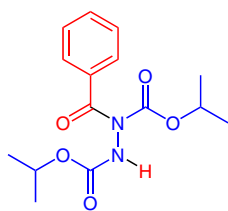
Cobalt-Impregnated Magnetite as General Heterogeneous Catalyst for the Hydroacylation Reaction of Azodicarboxylates

Adv. Synth. Catal. **2014**, *356*, 3039–3047.

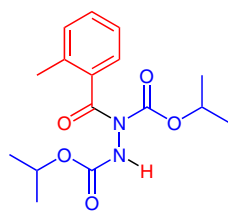
Hydroacylation of Azodicarboxylates with Aldehydes Using $\text{CoO-Fe}_3\text{O}_4$



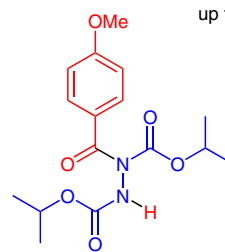
Selected examples:



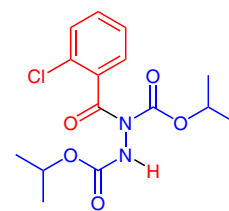
3a 89% yield



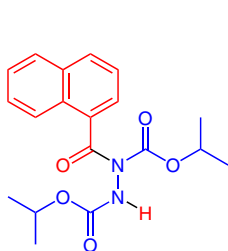
3b 86% yield



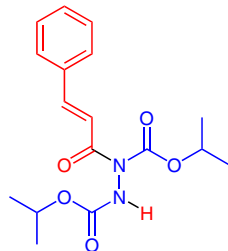
3c 67% yield



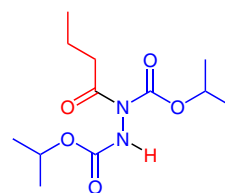
3d 95% yield



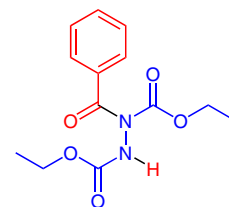
3e 87% yield



3f 74% yield



3g 99% yield



3h 99% yield

Significance: Magnetite-supported cobalt oxide ($\text{CoO-Fe}_3\text{O}_4$) was prepared by mixing $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$ and Fe_3O_4 in water followed by treatment with NaOH (eq. 1). $\text{CoO-Fe}_3\text{O}_4$ catalyzed the hydroacylation of azodicarboxylates **1** with aldehydes **2** in trichloroethylene to afford the hydroacylated products **3** in up to 99% yield (eq. 2).

Comment: In the formation of **3a**, the catalyst was recovered by magnetic separation and reused nine times with slight loss of its catalytic activity. The catalytic activity of $\text{CoO-Fe}_3\text{O}_4$ was superior to that of the other metal oxides supported on Fe_3O_4 ($\text{NiO-Fe}_3\text{O}_4$, $\text{CuO-Fe}_3\text{O}_4$, $\text{Ru}_2\text{O}_3\text{-Fe}_3\text{O}_4$, $\text{Rh}_2\text{O}_3\text{-Fe}_3\text{O}_4$, $\text{PdO-Fe}_3\text{O}_4$, $\text{Ag}_2\text{O/Ag-Fe}_3\text{O}_4$, $\text{WO}_x\text{-Fe}_3\text{O}_4$, $\text{OsO-Fe}_3\text{O}_4$, $\text{PtO/PtO}_2\text{-Fe}_3\text{O}_4$, $\text{Au}_2\text{O}_3\text{/Au-Fe}_3\text{O}_4$, $\text{NiO/Cu-Fe}_3\text{O}_4$, $\text{PdO/Cu-Fe}_3\text{O}_4$) and unsupported CoO.

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