Cyclopropanation of Alkenes with Diazoesters Using Cu@FeNPs

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\begin{align*}
\text{R}_1\text{R}_2\text{R}_3 + \text{R}_4\text{O}^\text{N}_2 & \xrightarrow{\text{Cu@FeNPs (cat.)}} \text{R}_1\text{R}_2\text{R}_3\text{R}_4 \text{ (trans/cis)} \\
\text{R}_4 & = \text{Bn 68\%}, \quad \text{trans/cis} = 1.6:1 \\
\text{R}_4 & = \text{4-MeOC}_6\text{H}_4 68\% \\
\text{trans/cis} & = 1.2:1
\end{align*}
\]

Significance: Copper-plated iron nanoparticles (Cu@FeNPs) catalyzed the cyclopropanation of alkenes with diazoesters to give the corresponding substituted cyclopropanes in up to 76\% yield (16 examples). In the reaction of 4-vinylanisole with benzyl diazoacetate, the catalyst was recovered by magnetic separation and reused four times without significant loss of catalytic activity.

Comment: The authors reported previously the preparation of Cu@FeNPs and its application to the Huisgen reaction (Green Chem. 2012, 14, 622). ICP analysis revealed that 12 ppm of copper leached out from the fresh catalyst during the reaction. The leached copper species showed no catalytic activity.