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In Situ Generated Iron Oxide Nanocrystals as Efficient and Selective Catalysts for the Reduction of Nitroarenes Using a Continuous Flow Method
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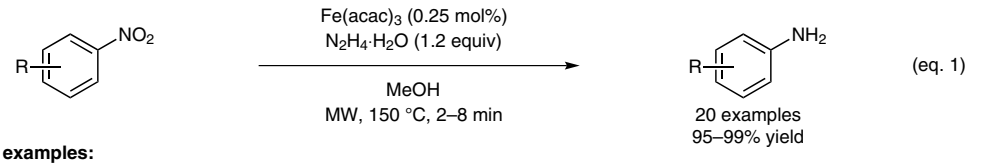
Reduction of Nitroarenes Using In Situ Generated Iron Oxide Nanocrystals

Category
Polymer-Supported Synthesis

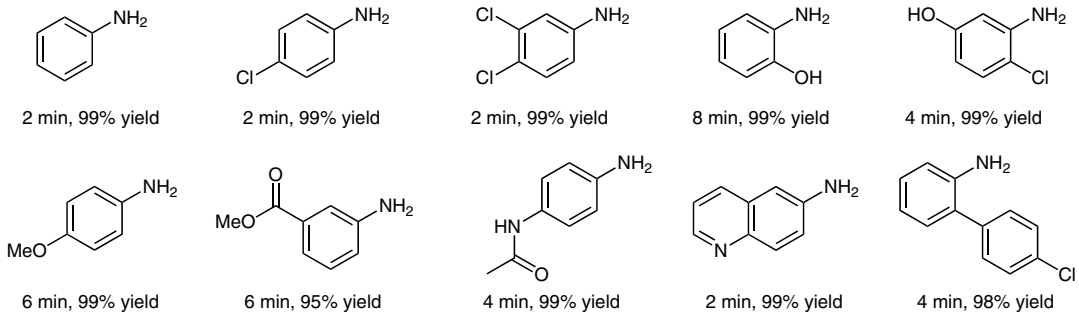
Key words
iron
nanoparticles
nitroarenes
reduction
flow reaction

Reduction of nitroarenes using the batch system:

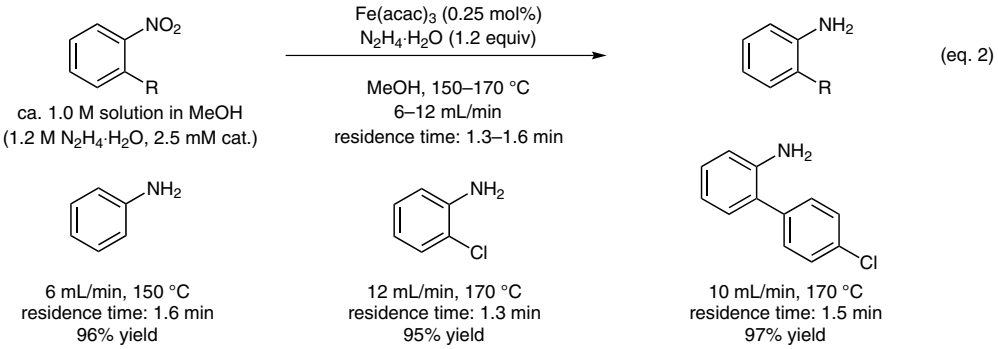


(eq. 1)

Selected examples:



Continuous-flow reduction of nitroarenes:



(eq. 2)

Significance: Iron oxide nanocrystals, generated in situ from $Fe(acac)_3$ and hydrazine hydrate, catalyzed the reduction of nitroarenes with hydrazine hydrate under microwave conditions to give the corresponding anilines in 95–99% yield (20 examples, eq. 1). In the reduction of nitrobenzene to aniline using the batch system, the catalyst was magnetically separated from the reaction mixture and reused seven times.

Comment: The reduction of nitroarenes was also performed using a continuous-flow system to afford the anilines in 95–97% yield (eq. 2). The in situ generated iron oxide nanoparticles were characterized by XRD and HRTEM analyses. ICP–MS showed 7.9% iron leaching from the catalyst during the reduction using the batch system.

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