

H. WEI, Y. REN, A. WANG*, X. LIU, X. LIU, L. ZHANG, S. MIAO, L. LI, J. LIU, J. WANG, G. WANG, D. SU, T. ZHANG* (DALIAN INSTITUTE OF CHEMICAL PHYSICS, UNIVERSITY OF CHINESE ACADEMY OF SCIENCE, BEIJING, AND INSTITUTE OF COAL CHEMISTRY, TAIYUAN, P. R. OF CHINA; ARIZONA STATE UNIVERSITY, TEMPE, USA)
 Remarkable Effect of Alkaline on the Chemoselective Hydrogenation of Functionalized Nitroarenes over High-Loading Pt/FeO_x Catalysts
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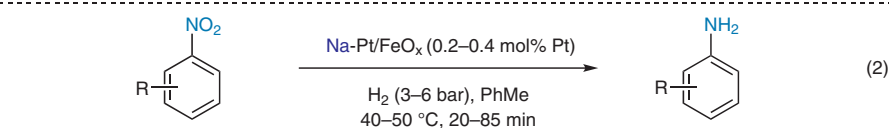
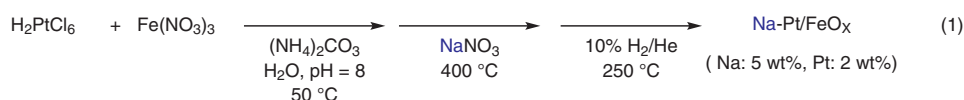
Category

Polymer-Supported Synthesis

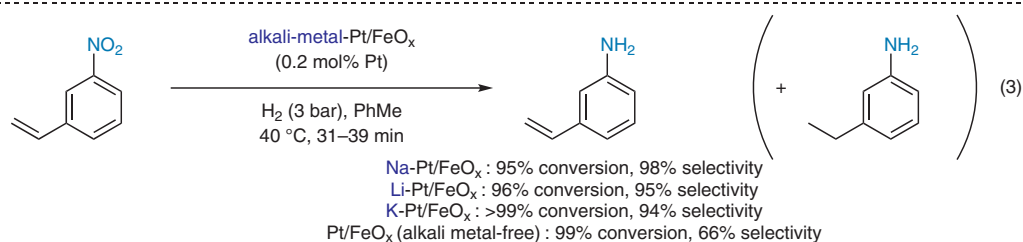
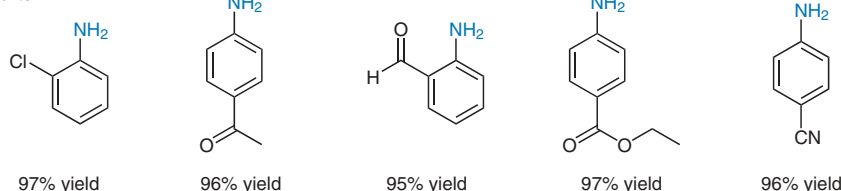
Key words

chemoselectivity
 hydrogenation
 platinum catalysis
 nitroarenes
 anilines

Synfact
of the month



Results:



Significance: A sodium-containing FeO_x-supported platinum catalyst (Na-Pt/FeO_x) was prepared by mixing H₂PtCl₆ and Fe(NO₃)₃ with (NH₄)₂CO₃ in water, followed by the treatment with NaNO₃, calcination, and reduction with hydrogen (eq. 1). Na-Pt/FeO_x catalyzed the chemoselective hydrogenation of substituted nitroarenes under hydrogen pressure to afford the corresponding anilines in 95–97% yield (eq. 2). In the hydrogenation of 3-nitrostyrene, Na-Pt/FeO_x promoted the hydrogenation of the nitro group to give 3-aminostyrene in 95% conversion with 98% selectivity (eq. 3). The catalyst was reused three times without significant loss of its catalytic activity or chemoselectivity.

Comment: Other alkali-metal-containing Pt/FeO_x catalysts (Li-Pt/FeO_x and K-Pt/FeO_x) also promoted the selective hydrogenation of 3-nitrostyrene to 3-aminostyrene in 96 to >99% conversion and 94–95% selectivity. Compared with alkali-metal-containing catalysts, alkali-metal-free Pt/FeO_x showed a lower selectivity (99% conversion and 66% selectivity). The authors have previously reported the chemoselective hydrogenation of functionalized nitroarenes to the corresponding anilines by using FeO_x-supported platinum catalysts prepared from H₂PtCl₆, Fe(NO₃)₃, and Na₂CO₃ (*Nat. Commun.* **2014**, *5*, 5634).

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