
Remarkable Effect of Alkalis on the Chemoselective Hydrogenation of Functionalized Nitroarenes over High-Loading Pt/FeOₓ Catalysts


Chemoselective Hydrogenation of Functionalized Nitroarenes to Anilines

**Significance:** A sodium-containing FeOₓ-supported platinum catalyst (Na-Pt/FeOₓ) 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/FeOₓ 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/FeOₓ catalyzed 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/FeOₓ catalysts (Li-Pt/FeOₓ and K-Pt/FeOₓ) 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/FeOₓ 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 FeOₓ-supported platinum catalysts prepared from H₂PtCl₆, Fe(NO₃)₃, and Na₂CO₃ (Nat. Commun. 2014, 5, 5634).