Electronic Supplementary Information

Ethynediamine-functionalized Magnetic Fe₃O₄@SiO₂ Nanoparticles: cooperative trifunctional catalysis for selective synthesis of nitroalkenes

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List of Products

1. $^1$H NMR spectra data of the products.

Yellow solid; $^1$H NMR (400 MHz, CDCl$_3$) $\delta = 7.98$ (d, $J = 13.6$ Hz, 1H), 7.53 (dd, $J = 11.1$, 6.6 Hz, 3H), 6.98 (d, $J = 8.7$ Hz, 2H), 3.89 (s, 3H).

Yellow solid; $^1$H NMR (400 MHz, CDCl$_3$) $\delta = 8.01$ (d, $J = 13.6$ Hz, 1H), 7.60 (d, $J = 13.6$ Hz, 1H), 7.47 (d, $J = 8.0$ Hz, 2H), 7.29 (d, $J = 7.8$ Hz, 2H), 2.44 (s, 3H).

Yellow solid; $^1$H NMR (400 MHz, CDCl$_3$) $\delta = 8.01$ (d, $J = 13.6$ Hz, 1H), 7.55 (dd, $J = 13.6$ Hz, 1H), 7.50 (d, $J = 8.5$ Hz, 2H), 6.94 (d, $J = 8.5$ Hz, 2H), 4.84 - 4.70 (m, 1H).

Yellow solid; $^1$H NMR (400 MHz, CDCl$_3$) $\delta = 8.04$ (d, $J = 13.7$ Hz, 1H), 7.62 (d, $J = 13.7$ Hz, 1H), 7.60 - 7.45 (m, 5H).

Yellow solid; $^1$H NMR (400 MHz, CDCl$_3$) $\delta = 8.45$ (s, 1H), 8.38 (d, $J = 8.2$ Hz, 1H), 8.08 (d, $J = 13.7$ Hz, 1H), 7.90 (d, $J = 7.7$ Hz, 1H), 7.75 - 7.66 (m, 2H).
Light yellowish solid; $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ = 7.99 (d, $J = 13.7$ Hz, 1H), 7.60 (d, $J = 13.7$ Hz, 1H), 7.52 (d, $J = 8.5$ Hz, 2H), 7.46 (d, $J = 8.5$ Hz, 2H).²

Yellow solid; $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ = 8.16 – 7.87 (m, 1H), 7.70 – 7.49 (m, 1H), 7.33 – 7.15 (m, 1H), 7.13 – 6.75 (m, 2H), 3.97 (s, 6H).⁴

Orange yellow solid; $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ = 7.96 (d, $J = 13.5$ Hz, 1H), 7.51 (d, $J = 13.5$ Hz, 1H), 7.12 (d, $J = 7.7$ Hz, 1H), 7.04 (s, 1H), 6.91 (d, $J = 7.9$ Hz, 1H), 6.10 (s, 2H).⁴

Yellow solid; $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 7.81 (d, $J = 13.2$ Hz, 1H), 7.64 – 7.51 (m, 2H), 6.92 (d, $J = 3.4$ Hz, 1H), 6.61 (dd, $J = 3.3$, 1.7 Hz, 1H).

Yellow solid; $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ = 8.85 (d, $J = 13.4$ Hz, 1H), 8.14 (t, $J = 7.9$ Hz, 1H), 8.02 (t, $J = 6.6$ Hz, 1H), 7.95 (d, $J = 7.8$ Hz, 1H), 7.76 (t, $J = 6.5$ Hz, 1H), 7.70 – 7.59 (m, 3H), 7.54 (t, $J = 7.7$ Hz, 1H).⁴
References


Fig. S1 $^1$H NMR spectra of 3a in CDCl$_3$

Fig. S2 $^1$H NMR spectra of 3b in CDCl$_3$
Fig. S3 $^1$H NMR spectra of 3c in CDCl$_3$

Fig. S4 $^1$H NMR spectra of 3d in CDCl$_3$
Fig. S5 $^1$H NMR spectra of 3e in CDCl$_3$

Fig. S6 $^1$H NMR spectra of 3f in CDCl$_3$
Fig. S7 $^1$H NMR spectra of 3g in CDCl$_3$

Fig. S8 $^1$H NMR spectra of 3h in CDCl$_3$
Fig. S9 $^1$H NMR spectra of 3i in CDCl$_3$

Fig. S10 $^1$H NMR spectra of 3j in CDCl$_3$