Electronic Supplementary Material (ESI) for Catalysis Science & Technology

Entangled Pd complexes over Fe_3O_4@SiO_2 as supported catalysts for hydrogenation and Suzuki reactions

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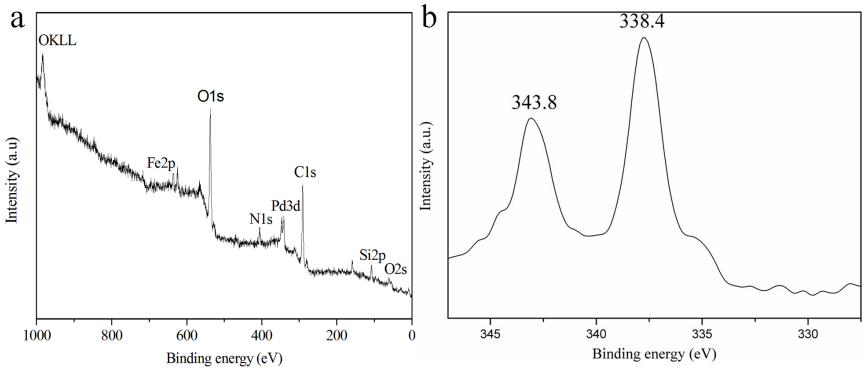


Fig. S1 XPS spectrum of the elemental survey scan of XL-Pd(Ⅱ)-Fe_3O_4@SiO_2

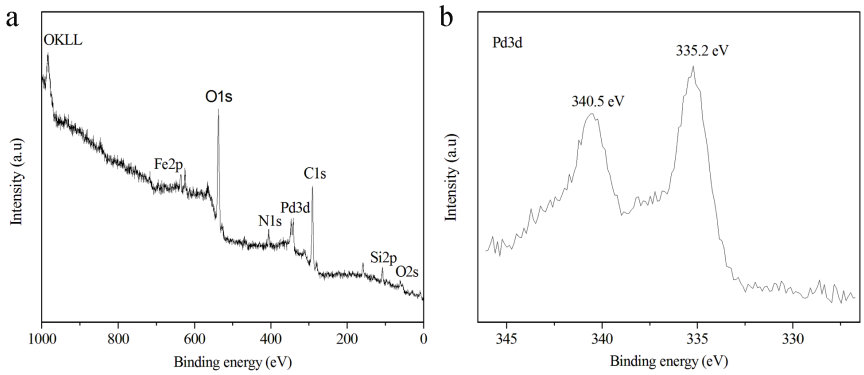


Fig. S2 XPS spectrum of the elemental survey scan of XL-Pd(0)-Fe_3O_4@SiO_2

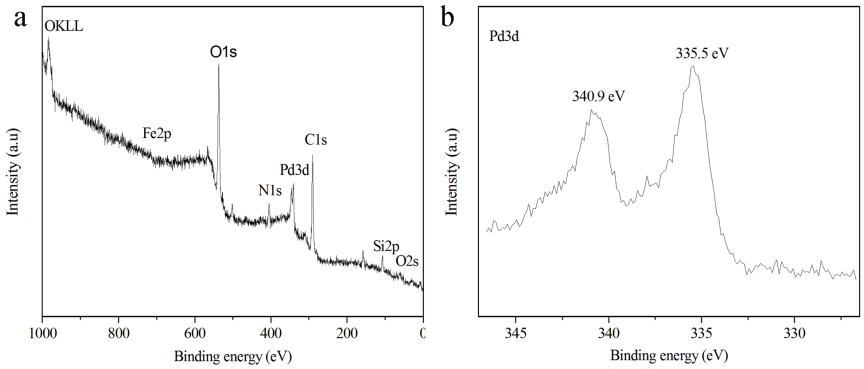
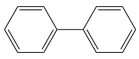
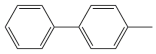


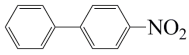
Fig. S3 XPS spectrum of the elemental survey scan of XL-Pd(0)-Fe_3O_4@SiO_2 after 5 times.

1. Biphenyl.  ^{1}H NMR ($CDCl_3$, 400 MHz, 25℃)

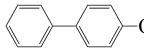
   δ 7.34 (t, 2H, $^3J_{HH}$=7.2 Hz), 7.44 (t, 4H, $^3J_{HH}$=7.6 Hz), 7.59 (d, 4H, $^2J_{HH}$=4.0 Hz)

2. 4-methyl-biphenyl.  ^{1}H NMR ($CDCl_3$, 400 MHz, 25℃)

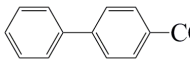
   δ 2.37 (s, 3H, CH_3), 7.23 (d, 2H, $^2J_{HH}$=4.0 Hz), 7.30 (t, 1H, $^3J_{HH}$=7.2 Hz), 7.41 (t, 2H, $^3J_{HH}$=7.6 Hz), 7.47 (t, 2H, $^3J_{HH}$=9.6 Hz), 7.56 (d, 2H, $^2J_{HH}$=4.0 Hz)

3. 4-Nitro-biphenyl.  ^{1}H NMR ($(CD_3)_2SO$, 400 MHz, 25℃)

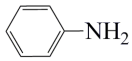
   δ 6.85 (d, 1H, $^2J_{HH}$=8.8 Hz), 7.27 (t, 2H, $^3J_{HH}$=7.6Hz), 7.40 (t, 2H, $^3J_{HH}$=7.8 Hz), 7.48 (d, 2H, $^2J_{HH}$=8.4 Hz), 7.56 (d, 2H, $^2J_{HH}$=7.6 Hz)

4. 4-Methoxy-biphenyl.  ^{1}H NMR ($CDCl_3$, 400 MHz, 25℃)

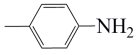
   δ 3.85 (s, 3H, OCH_3), 6.98 (d, 2H, $^2J_{HH}$=4.4 Hz), 7.30 (t, 1H, $^3J_{HH}$=7.2 Hz), 7.41 (t, 2H, $^3J_{HH}$=7.6 Hz), 7.54 (t, 4H, $^3J_{HH}$=7.6 Hz)

5. 1-biphenyl-4-yl-ethanone.  ^{1}H NMR ($CDCl_3$, 400 MHz, 25℃)

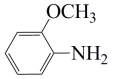
   δ 2.642 (s, 3H,), 7.40 (t, 1H, $^3J_{HH}$=7.2 Hz), 7.48 (t, 2H, $^3J_{HH}$=7.6 Hz), 7.63 (d, 2H, $^2J_{HH}$=3.6 Hz), 7.69 (d, 2H, $^2J_{HH}$=4.0 Hz), 8.04 (d, 2H, $^2J_{HH}$=4.0 Hz)

6. Aniline  ^{1}H NMR ($CDCl_3$, 400 MHz, 25℃)

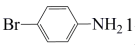
   δ 3.59 (s, 2H), 6.66 (d, 2H, J=8.4Hz), 6.75 (q, 1H, J=7.6 Hz) 7.13 (m, 2H)

7. P-toluidine  ^{1}H NMR ($CDCl_3$, 400 MHz, 25℃)

   δ 2.50 (m, 3H), 4.76 (S 2H), 6.48 (m, 2H), 6.82 (d, J= 4.0Hz).

8. O-anisidine  ^{1}H NMR ($CDCl_3$, 400 MHz, 25℃)

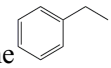
   δ 3.75 (s, 2H), 3.81 (s, 3H), 6.08 (m, 2H), 6.78 (m, 2H)

9. Bromoaniline  ^{1}H NMR ($CDCl_3$, 400 MHz, 25℃)

   δ 3.65 (s, 2H), 6.56 (d, 2H, J=7.2Hz), 7.24 (m, 2H)

10. Naphthylamine  ^{1}H NMR ($CDCl_3$, 400 MHz, 25℃)

    δ 5.71 (s, 2H), 6.69 (m, 1H), 7.08 (d, 2H, J=4Hz), 7.21 (q, 1H, J=8Hz), 7.34 (d, 1H, J=0.8Hz), 7.38~7.42 (m, 2H), 7.72 (d, 1H, J=4Hz), 8.08 (d, 1H, J=4Hz)

11. Ethylbenzene  ^{1}H NMR ($CDCl_3$, 400 MHz, 25℃)

δ 1.23 (m, 3H), 2.64 (m, 2H), 7.17 (m, 3H), 7.28 (m, 2H)