

Electronic Supplementary Information

Pd and Pd-CuO nanoparticles in hollow silicalite-1 single crystals for enhancing selectivity and activity for the Suzuki-Miyaura reaction

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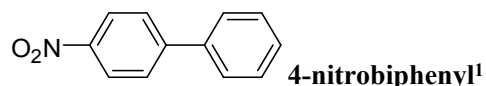
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c EMS Energy Institute, PSU-DUT Joint Center for Energy Research and Department

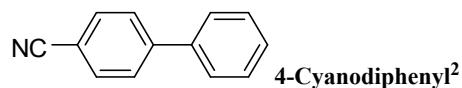
of Energy & Mineral Engineering, Pennsylvania State University, University Park,

Pennsylvania 16802, United States.

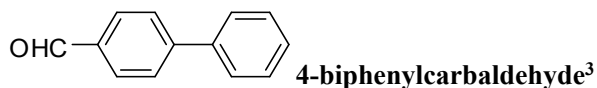
¹H NMR Data



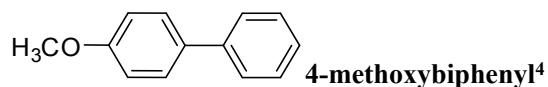
¹H NMR (400 MHz, CDCl₃, TMS): δ 8.30 (d, J = 8.8 Hz, 2H), 7.74 (d, J = 8.9 Hz, 2H), 7.63 (d, J = 7.0 Hz, 2H), 7.47 (dd, J = 14.8, 7.3 Hz, 3H).



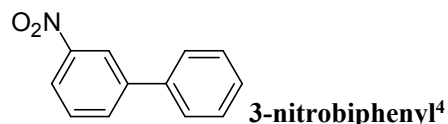
¹H NMR (400 MHz, CDCl₃, TMS): δ 7.70 (q, 4H), 7.59 (d, J = 7.2 Hz, 2H), 7.48 (t, 2H), 7.42 (t, J = 7.2 Hz, 1H).



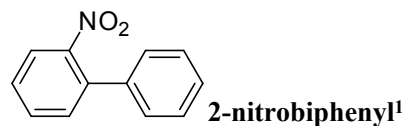
¹H NMR (400 MHz, CDCl₃, TMS): δ 10.04 (s, 1H), 7.94 (d, J = 6.8 Hz, 2H), 7.75 (d, J = 8.4 Hz, 2H), 7.63 (d, J = 7.2 Hz, 2H), 7.49 (t, J = 7.4 Hz, 2H), 7.41 (t, J = 7.4 Hz, 1H).



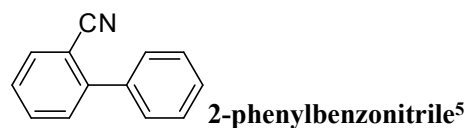
¹H NMR (400 MHz, CDCl₃, TMS): δ 7.54 (t, J = 8.0 Hz, 4H), 7.42 (t, J = 7.6 Hz, 2H), 7.31 (d, J = 7.2 Hz, 1H), 6.98 (d, J = 8.8 Hz, 2H), 3.86 (s, 3H).



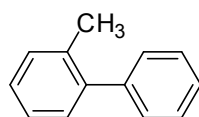
¹H NMR (400 MHz, CDCl₃, TMS): δ 8.45 (t, J = 1.9 Hz, 1H), 8.24 – 8.16 (m, 1H), 7.91 (d, J = 7.8 Hz, 1H), 7.62 (dt, J = 11.3, 4.7 Hz, 3H), 7.50 (dd, J = 10.0, 4.7 Hz, 2H), 7.47 – 7.35 (m, 1H).



¹H NMR (400 MHz, CDCl₃, TMS): δ 7.85 (d, J = 8 Hz, 1H), 7.61 (t, J = 7.5 Hz, 1H), 7.50-7.49 (m, 5H), 7.33-7.31 (m, 2H).

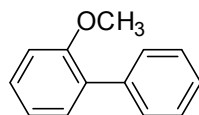


¹H NMR (400 MHz, CDCl₃, TMS): δ 7.75 (d, J = 7.8 Hz, 1H), 7.63 (t, J = 7.7 Hz, 1H), 7.55 (d, J = 6.7 Hz, 2H), 7.53 – 7.47 (m, 3H), 7.47 – 7.39 (m, 2H).



2-methylbiphenyl³

¹H NMR (400 MHz, CDCl₃): δ 7.39-7.43 (m, 2H), 7.31-7.35 (m, 3H), 7.24-7.26 (m, 4H), 2.25 (s, 3H).



2-methoxybiphenyl³

¹H NMR (400 MHz, CDCl₃): δ 7.53 (d, J = 7.0 Hz, 2H), 7.40 (t, J = 7.5 Hz, 2H), 7.32 (dd, J = 15.7, 1.5 Hz, 3H), 7.03 (t, J = 7.5 Hz, 1H), 7.00 – 6.95 (m, 1H), 3.80 (s, 1H).

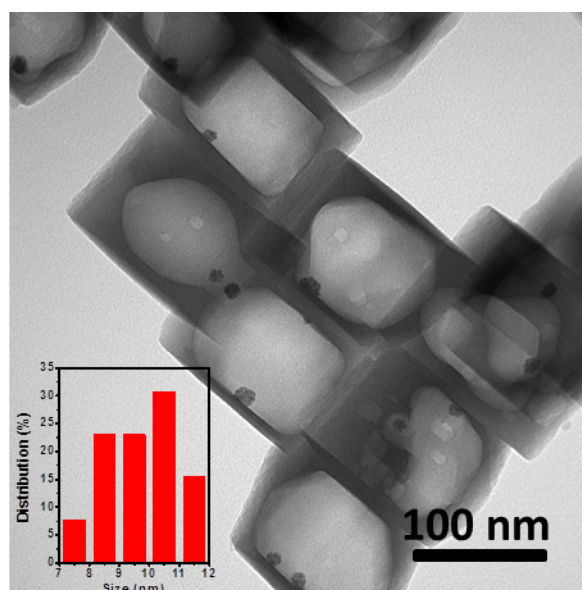


Fig. S1 TEM image and Pd particle size distribution (inset) of Pd@Hol S-1 after Suzuki-Miyaura reaction.

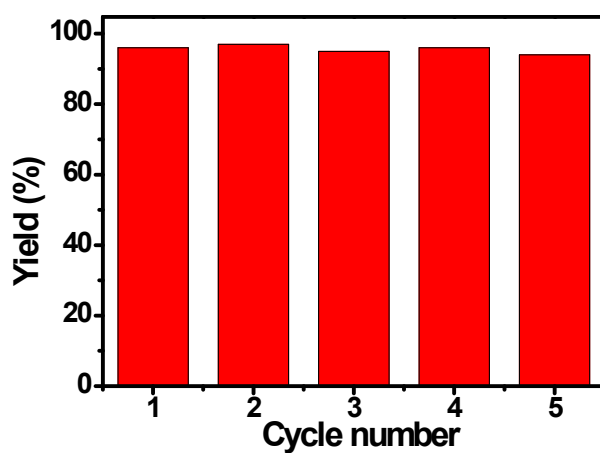
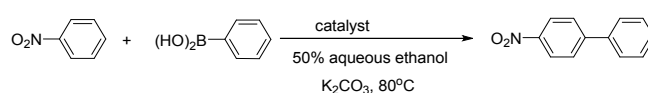


Fig. S2 The recycling performance of Pd@Hol S-1.

Reference

- (1) W. Han, C. Liu and Z. L. Jin, *Adv. Synth. Catal.* 2008, **350**, 501.
- (2) G. A. Molander and B. Biolatto, *Org. Lett.* 2002, **4**, 1867.
- (3) N. Kataoka, Q. Shelby, J. P. Stambuli, J. F. Hartwig, *J. Org. Chem.* 2002, **67**, 5553.
- (4) L. Liu, W. Wang, C. Xiao, *J. Organomet. Chem.*, 2014, **749**, 83–87.
- (5) L. Ackermann, C. Gschrei, A. Althammer and M. Riederer, *Chem. Commun.* 2006, **13**, 1419.