Supporting Information

New hybrid nanocatalyst based on Cu-doped Pd -Fe_3O_4 for tandem synthesis of 2-phenylbenzofurans

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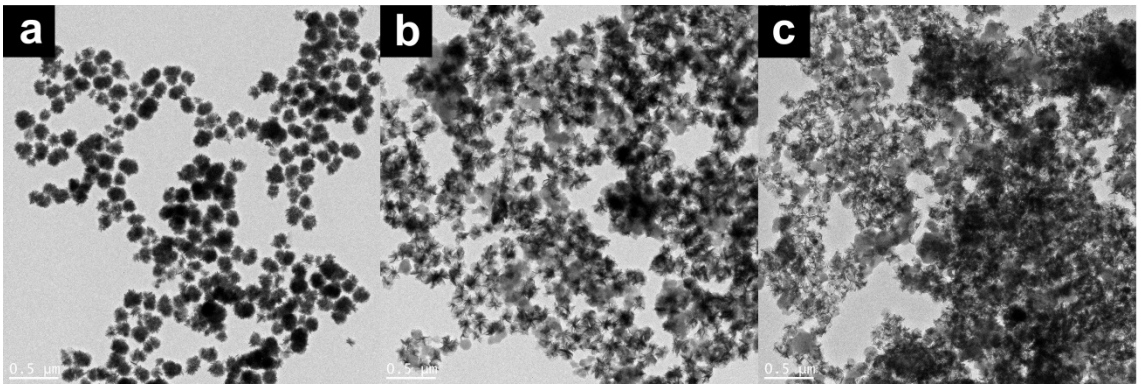


Fig. S1 Low magnified TEM images of the (a) Cu-doped Pd-Fe_3O_4-0, (b) Cu-doped Pd-Fe_3O_4-0.3 and (c) Cu-doped Pd-Fe_3O_4-0.5 nanocomposites.

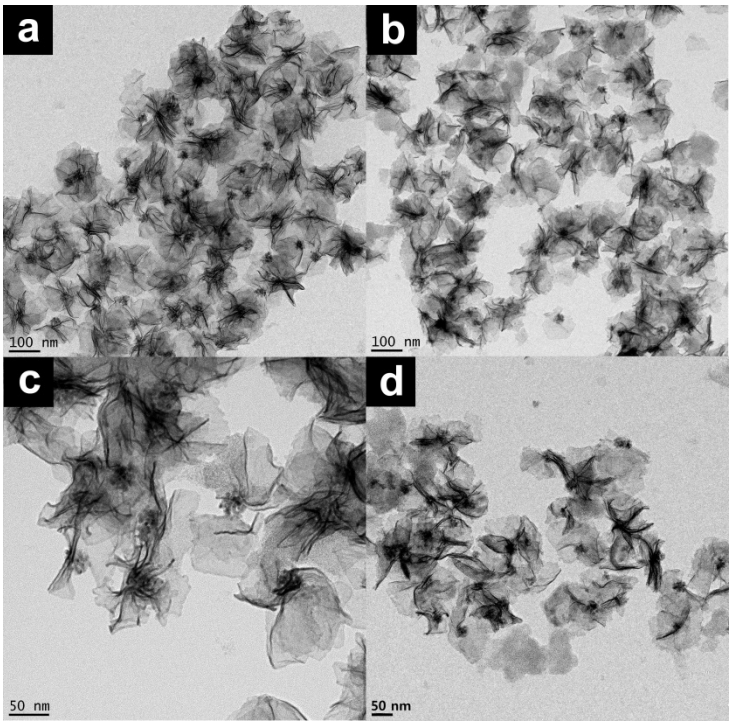


Fig. S2 TEM images of the Cu-doped Pd-Fe_3O_4-0.3 nanocomposites synthesized at different temperature (a,c) 160 ^oC and (b,d) 200 ^oC.

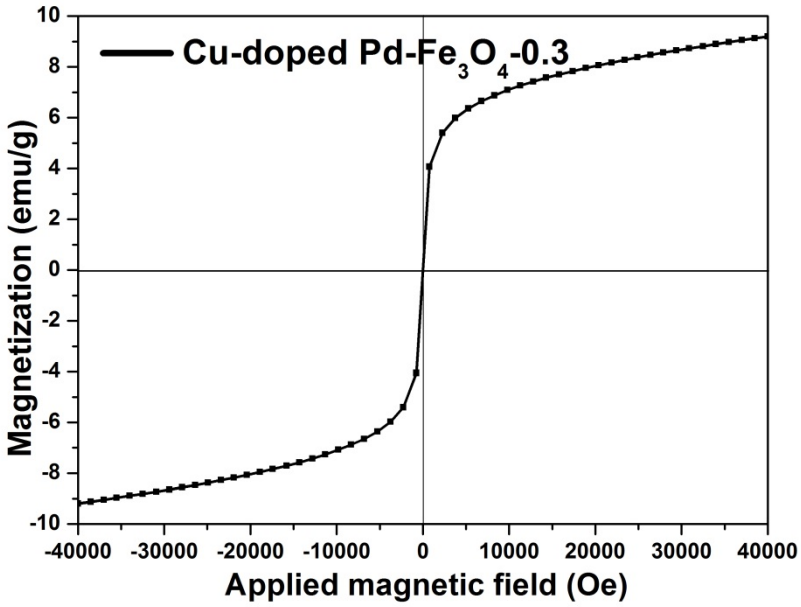


Fig. S3 SQUID data of Cu-doped Pd-Fe_3O_4 nanocomposites.

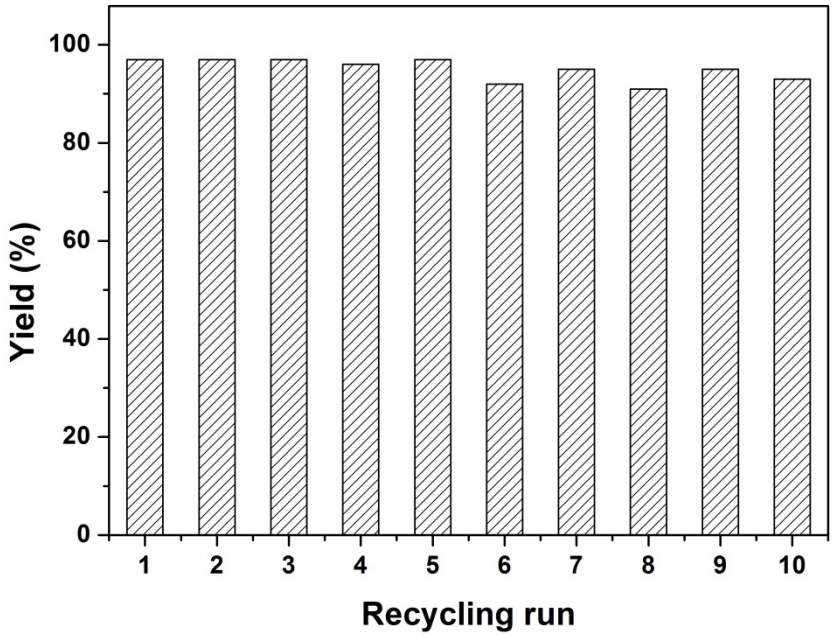


Fig. S4 GC-MS yields during ten recycling runs. Reaction condition: Cu-doped Pd-Fe_3O_4-0.3 catalyst (Cu base: 3.0 mol%), 2-iodophenol (0.5 mmol), phenylpropiolic acid (0.6 mmol), NaOAc (1.0 mmol), DMSO (5.0 ml) and 130 °C for 3 h.

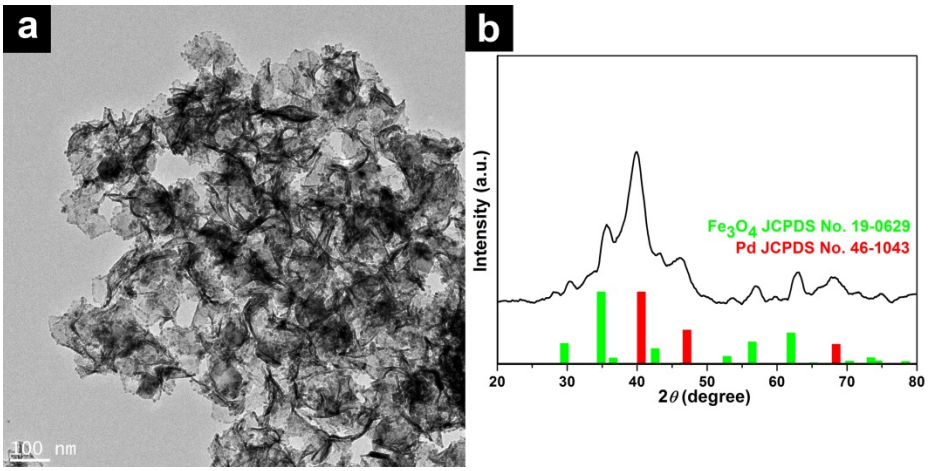


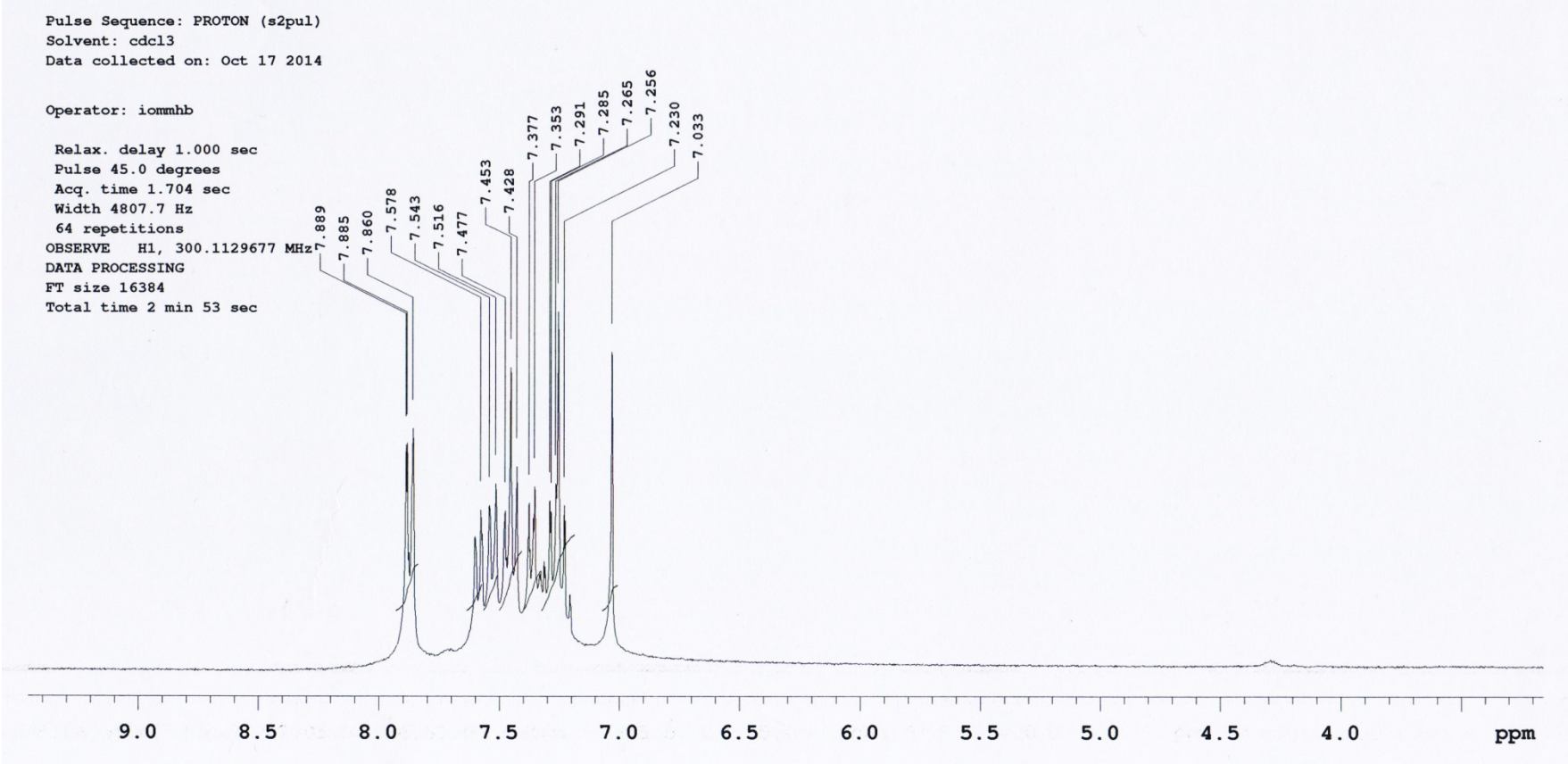
Fig. S5 (a,b) TEM image and XRD pattern of Cu-doped Pd-Fe_3O_4-0.3 catalyst after first reaction.

Data for ^{1}H and GC-MS spectra are reported as follows:

Chemical shift (δ ppm), multiplicity (s = singlet, d = doublet, t = triplet, m = multiplet), coupling constant (Hz), and integration.

2-phenybenzofuran[1] (Table 1): ^{1}H-NMR ($CDCl_3$, 300 MHz): δ = 7.87 (d, J = 8.1 Hz, 2H), 7.59 (d, J = 7.2 Hz, 1H), 7.53 (d, J = 8.1 Hz, 1H), 7.45 (t, J = 7.5 Hz, 2H), 7.35 (t, J = 7.2 Hz, 1H), 7.29 (t, J = 6.9 Hz, 1H), 7.23 (t, J = 6.9 Hz, 1H), 7.03 (s, 1H). MS (EI) m/z: 194(100), 165(60), 139(9), 97(11), 82(13), 28(16).

1. D. Zhao, C. Gao, X. Su, Y. He, J. You and Y. Xue, *Chem. Commun.* **2010,** *46,* 9049-9051.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Solvent: cdcl3
Data collected on: Oct 17 2014
Operator: iommhb
Relax. delay 1.000 sec
Pulse 45.0 degrees
Acq. time 1.704 sec
Width 4807.7 Hz
64 repetitions
OBSERVE H1, 300.1129677 MHz
DATA PROCESSING
FT size 16384
Total time 2 min 53 sec
7.889
7.885
7.860
7.578
7.543
7.516
7.477
7.453
7.428
7.377
7.353
7.291
7.285
7.265
7.256
7.230
7.033
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
ppm

Spectrum

Peak#:1 R.Time:22.844(Scan#:4070)
MassPeaks:245
RawMode:Averaged 22.840-22.850(4069-4071)
BG Mode:Calc. from Peak Group 1 - Event 1