Electronic Supplementary information (ESI)

Highly water-dispersible Pd nanoparticles and single atoms magnetite-supported as excellent catalysts for Suzuki and hydrogenation reactions

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Figures:

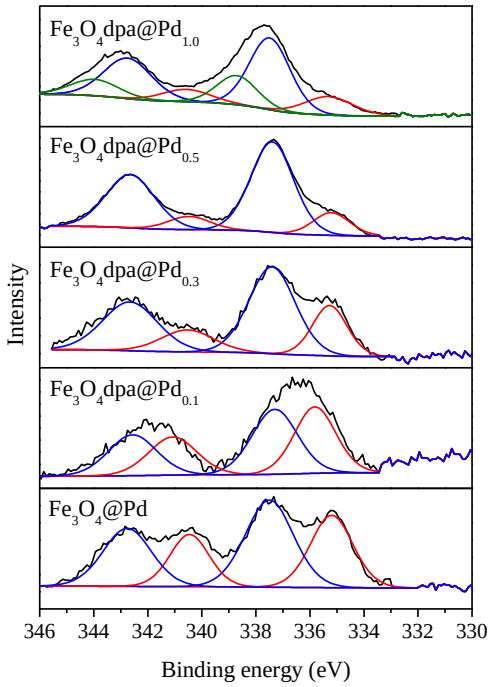

Fig. S1 Pd3d core level XPS of the catalysts. The black lines represent the experimental data, whereas the red, blue and green show the fitted Pd(0), Pd(II) and Pd(IV) components, respectively.

Tables:

Table S1. Temperature effect on Suzuki-Miyaura coupling with Fe_3O_4dpa@$Pd_{0.5}$ as catalyst.

Temperature (ºC)	TOF (h^{-1})
25	204
65	110000
80	182000

Bromobencene (3 mmol), phenylboronic acid (3.6 mmol), K_3PO_4 (9 mmol), catalyst (9.4×10^{-5} mmol Pd), 65 ºC and EtOH:water.

Table S2. Base effect on Suzuki-Miyaura coupling with Fe_3O_4dpa@$Pd_{0.5}$ as catalyst.

Base	TOF (h^{-1})
KOH	122
K_3PO_4	110000
K_2CO_3	100000
AcONa	28900
$NaHCO_3$	63500

Bromobencene (3 mmol), phenylboronic acid (3.6 mmol), base (9 mmol), catalyst (9.4×10^{-5} mmol Pd), 65 ºC, and EtOH:water.

Table S3. Solvent effect on Suzuki-Miyaura coupling with Fe_3O_4dpa@$Pd_{0.5}$ as catalyst.

Solvent	TOF (h^{-1})
EtOH	384
Water	1470
EtOH:Water	110000

Bromobencene (3 mmol), phenylboronic acid (3.6 mmol), K_3PO_4 (9 mmol), catalyst (9.4×10^{-5} mmol Pd), 65 ºC, and solvent (60 mL).

Table S4. Temperature effect on Suzuki-Miyaura coupling with Fe_3O_4dpa@$Pd_{0.5}$ as catalyst in water.

Temperature (ºC)	TOF (h^{-1})
65	3150
100	14950

Bromoaryl (0.5 mmol), phenylboronic acid (0.6 mmol), K_3PO_4 (1.5 mmol), 2.0×10^{-4} mmol Pd, water, air atmosphere.