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碳包覆Pd/TiO_2光催化产氢协同胺类选择性氧化合成亚胺

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Carbon-Encapsulated Pd/TiO_2 for Photocatalytic H_2 Evolution Integrated with Photodehydrogenative Coupling of Amines to Imines

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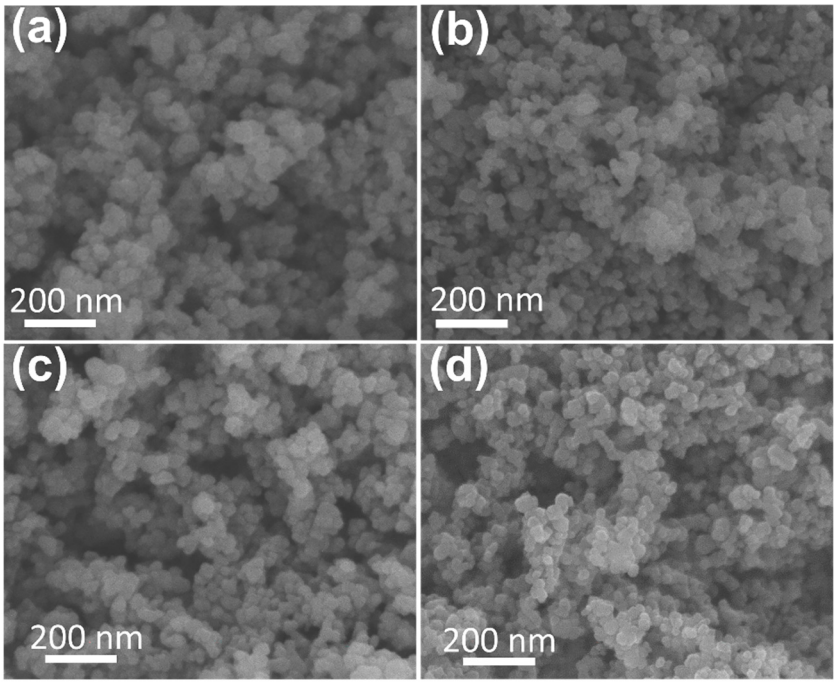

Fig. S1 SEM images of (a) Pd/TiO$_2$, (b) Pd/TiO$_2$@C-1, (c) Pd/TiO$_2$@C-2 and (d) Pd/TiO$_2$@C-3.

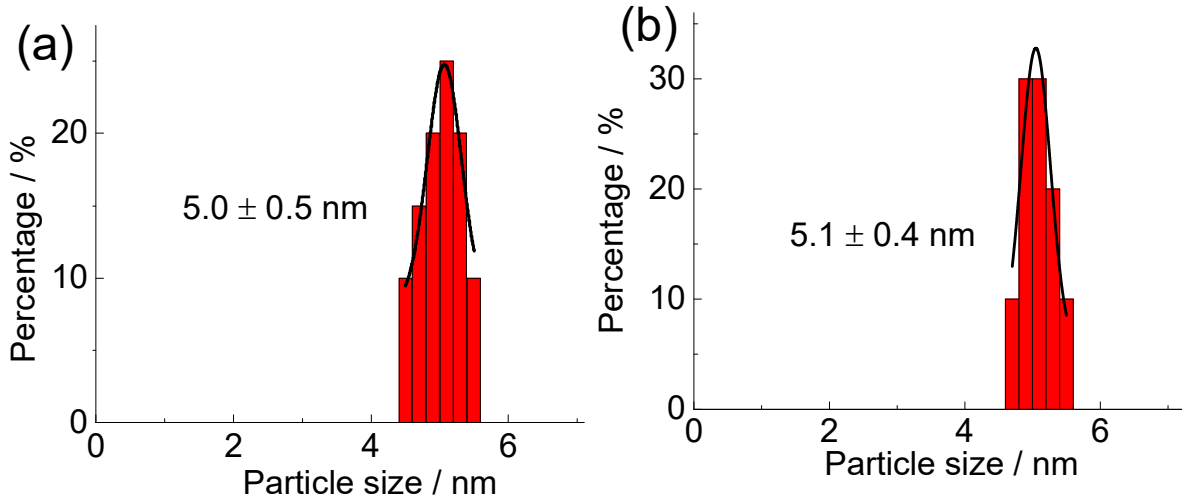

Fig. S2 Particle size distribution of nanosized Pd on (a) Pd/TiO$_2$ andb) Pd/TiO$_2$@C-2.

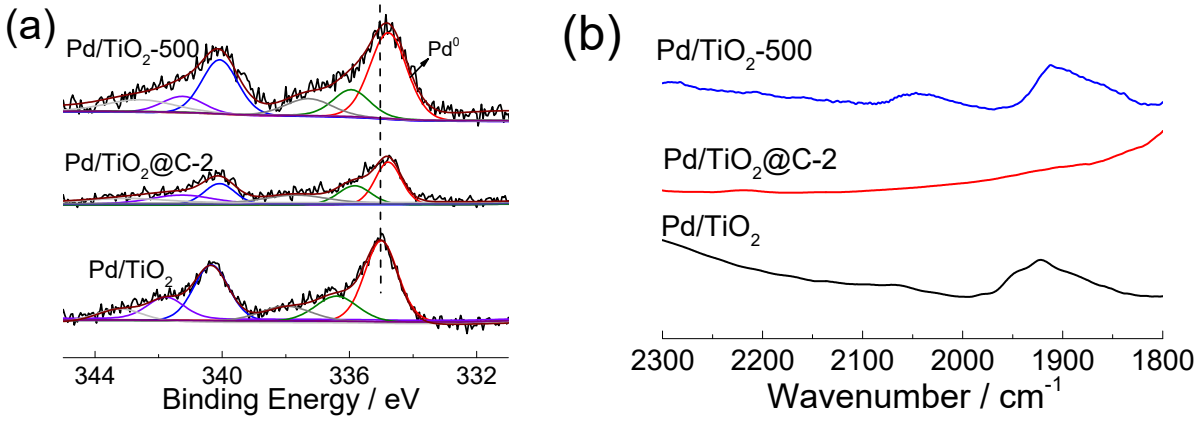

Fig. S3 (a) Pd 3d XPS spectra; (b) In-situ FTIR spectra of CO adsorption of Pd/TiO$_2$, Pd/TiO$_2$@C-2, and Pd/TiO$_2$-500.

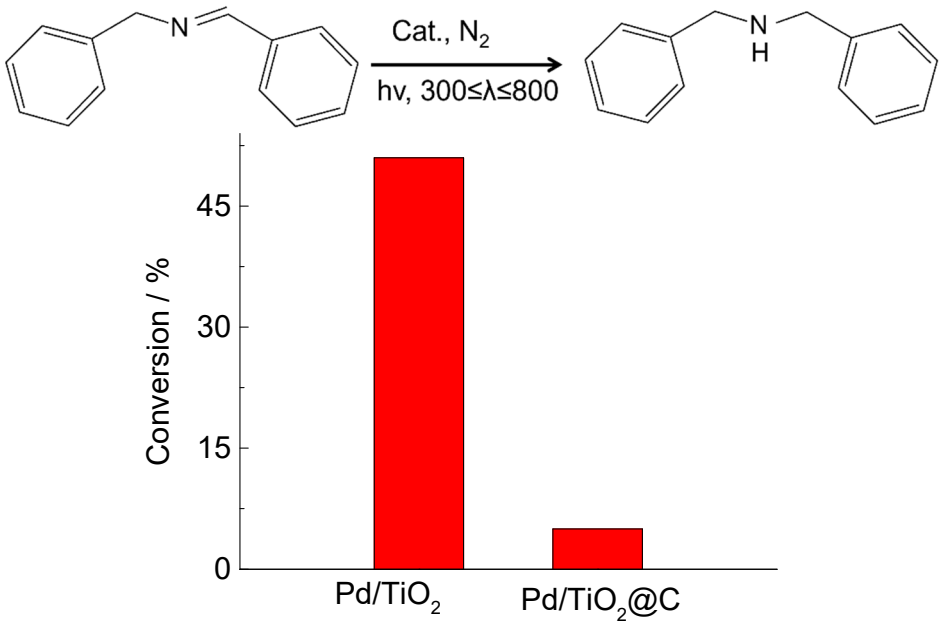

Fig. S4 The Photocatalytic performance for Pd/TiO_2 and Pd/TiO_2@C-2 with an N-benzylidenebenzylamine substrate.

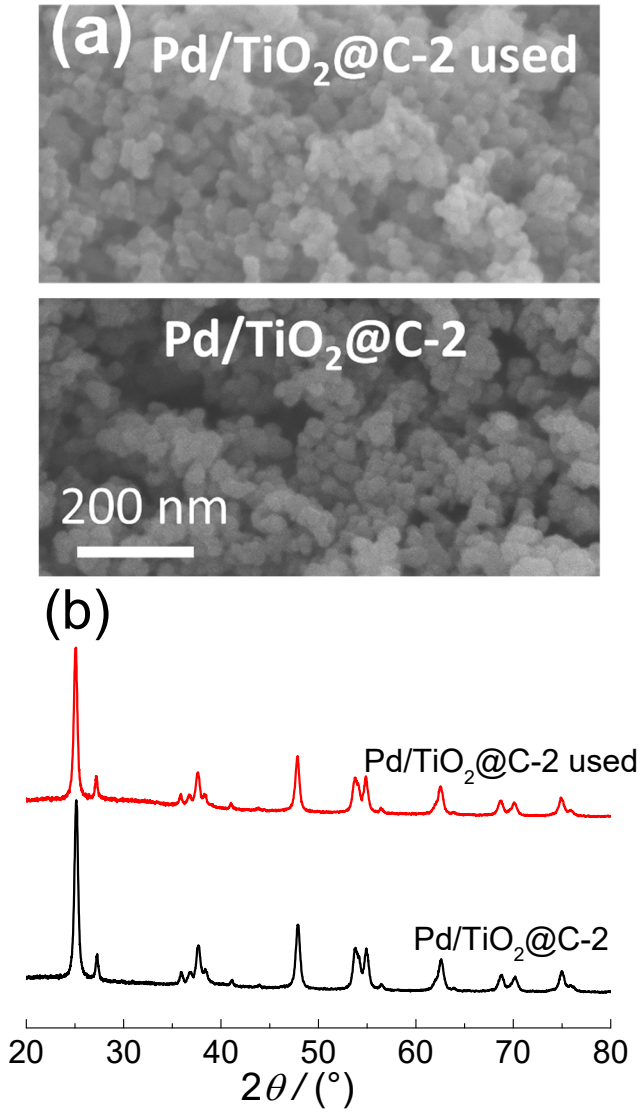

Fig. S5 (a) SEM and (b) XRD patterns of fresh and used Pd/TiO_2@C-2.

Table S1 Photocatalytic H_2 evolution integrated with oxidative coupling of amines on different kinds of supported metal photocatalysts [a].

Entry	Catalyst	Con./%	Sel./%	H_2 evolution/mmol
1	Pd/TiO_2	> 99	21	0.26
2	Pd/TiO_2@C-2	95	99	0.23
3	Au/TiO_2	> 99	80	0.38
4	Au/TiO_2@C-2	86.4	97	0.21
5	Pt/TiO_2	> 99	76	0.57
6	Pt/TiO_2@C-2	94	96	0.24

[a] 20 mg of photocatalysts, 0.5 mmol of benzylamine in 10 mL of the mixed solvent of 9.4 mL of acetonitrile and 0.6 mL of water, under N_2 atmosphere, Xenon lamp, 6 h.