

Supporting Information

Effective immobilization of nanoscale Pd on carbon hybrid for enhanced electrocatalytic performances: stabilization mechanism investigations

Liang Yang, Daoping Liu, Guomin Cui, Binlin Dou, Juan Wang**

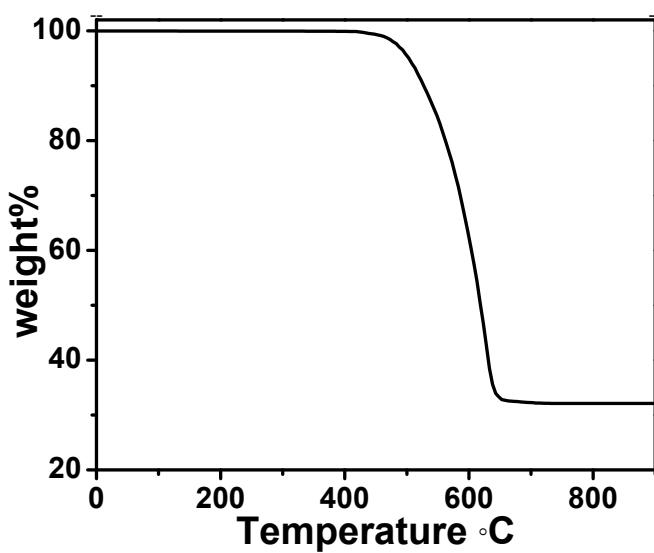


Fig. S1 Thermosgravimetric analysis (TGA) of Pd/NPG-CN.

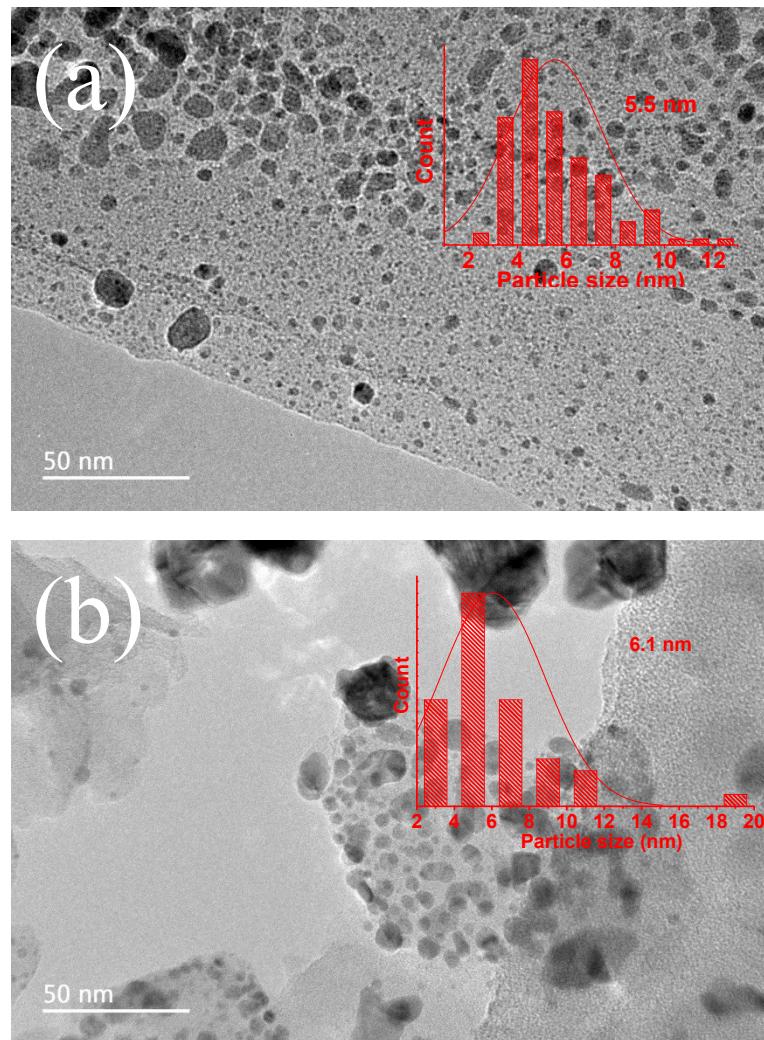


Fig. S2 TEM images of (a) Pd/NPG and (b) Pd/CN, and the inset in (a and b) is the particle size distributions.

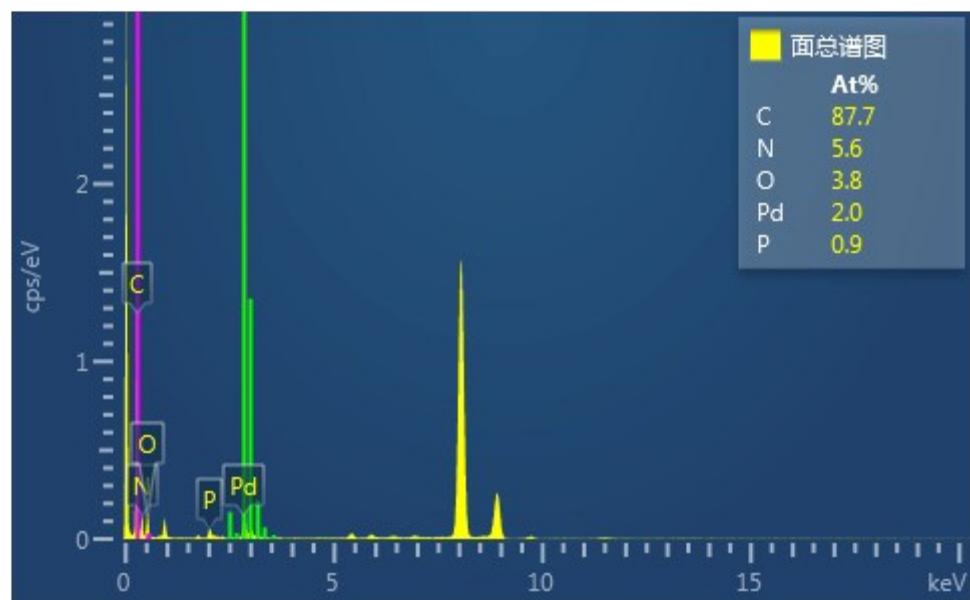


Fig. S3 EDX elemental analysis of Pd/NPG-CN0.3.

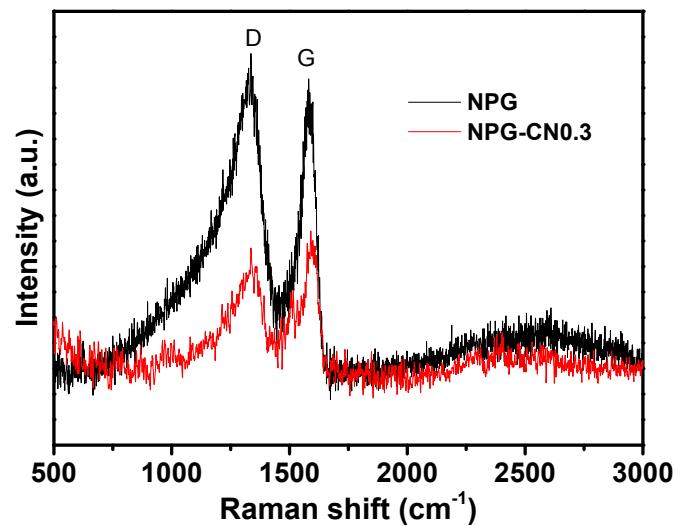


Fig. S4 Raman spectra of NPG and NPG-CN0.3.

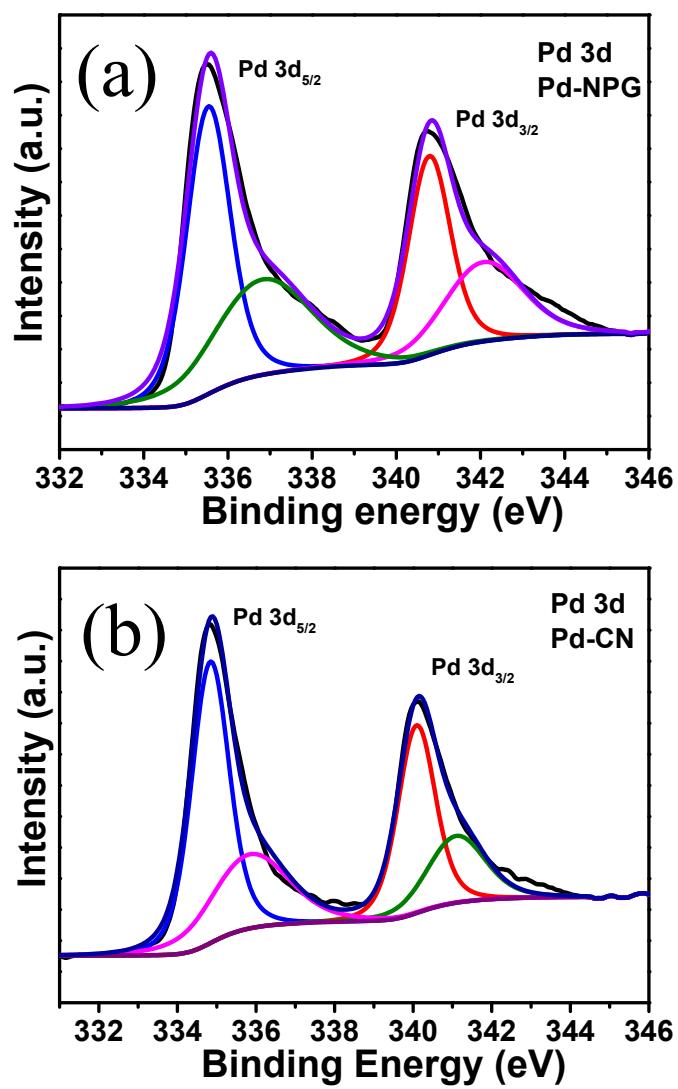


Fig. S5 XPS Pd 3d spectra of (a) Pd/NPG and (b) Pd/CN.

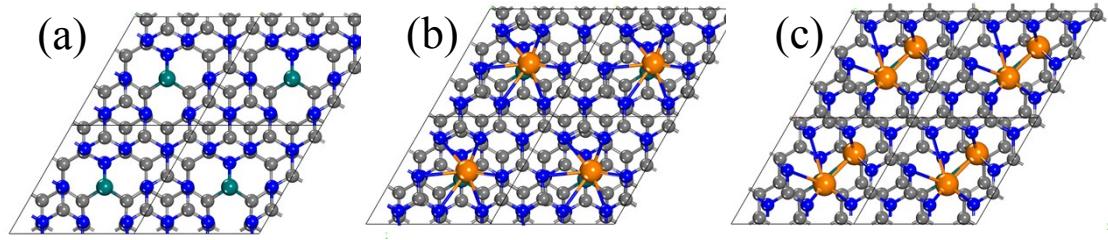


Fig. S6 Optimized geometry structure of NPG-CN, Pd1/NPG-CN and Pd2/NPG-CN. In the Pd1/NPG-CN, The Pd atom adsorbed at top site of P atom and hollow site of CN. The big orange, teal, grey and blue balls represent Pd, P, C and N atoms, respectively.

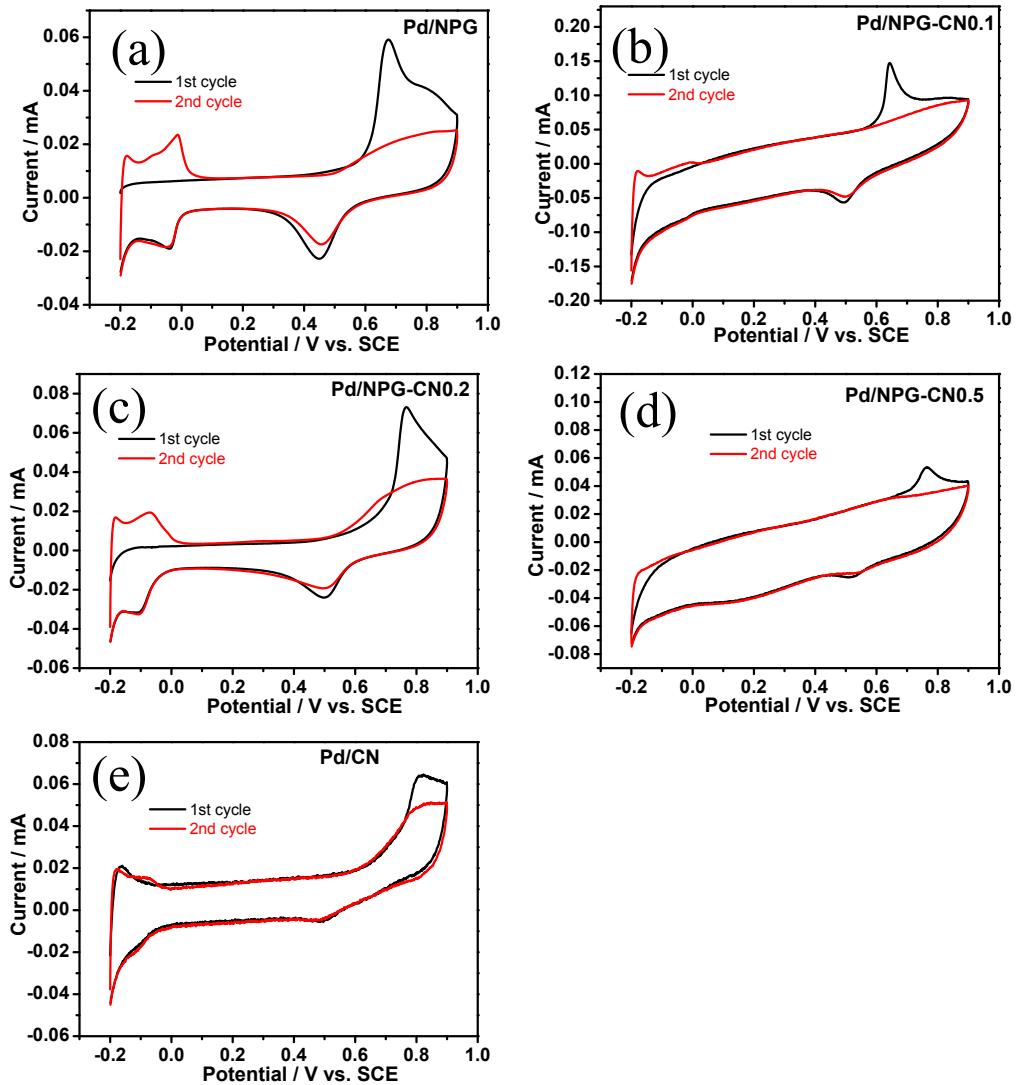


Fig. S7 The CO stripping curves for (a) Pd/NPG, (b) Pd/NPG-CN0.1, (c) Pd/NPG-CN0.2, (d) Pd/NPG-CN0.5 and (e) Pd/CN in 0.5 M H_2SO_4 at a scan rate of 10 mV s^{-1} .

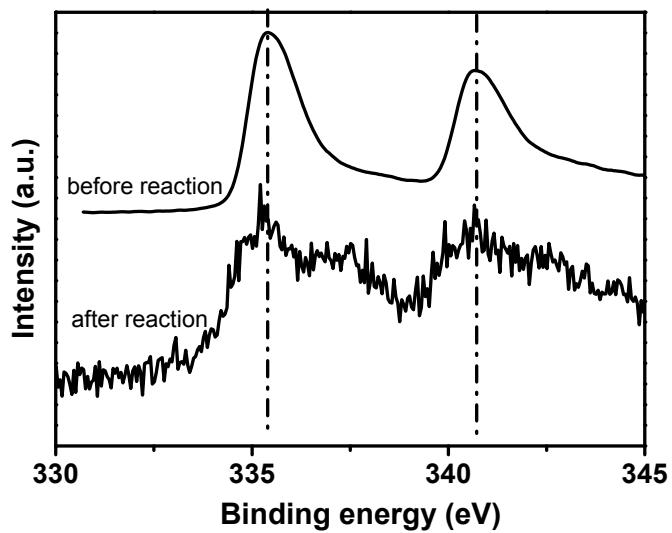


Fig. S8 Pd 3d XPS spectrum for Pd/NPG-CN before and after reactions.

Table S1 The elemental ratios (Atomic %) in different catalyst measured by XPS.

	C	N	O	P	Pd
Pd/NPG-CN0.1	67.29	9.38	9.76	2.03	11.54
Pd/NPG-CN0.2	63.3	13.27	9.42	1.95	12.06
Pd/NPG-CN0.3	58.50	17.99	9.09	1.74	12.67
Pd/NPG-CN0.5	52.29	24.93	8.41	1.50	12.87
Pd/NPG	68.68	7.51	9.94	2.26	11.61
Pd/CN	37.18	41.44	5.69	/	15.7