

Electronic Supplementary Information

Cyanogel auto-reduction induced synthesis of PdCo nanocubes on carbon nanobowls: A highly active electrocatalyst for ethanol electrooxidation

Guang-Rui Xu,^{‡a} Ya-Nan Zhai,^{‡b} Fu-min Li,^b Guang-Tao Zhao,^{*a} Shu-Ni Li,^b Hong-Chang Yao,^c Jia-Xing Jiang,^a and Yu Chen^{*a}

^a *Key Laboratory of Macromolecular Science of Shaanxi Province, Key Laboratory of Applied Surface and Colloid Chemistry (Ministry of Education), Shaanxi Key Laboratory for Advanced Energy Devices, School of Materials Science and Engineering, Shaanxi Normal University, Xi'an 710062, PR China*

^b *School of Chemistry and Chemical Engineering, Shaanxi Normal University, Xi'an 710062, PR China.*

^c *College of Chemistry and Molecular Engineering, Zhengzhou University, Zhengzhou 450001, PR China*

**Corresponding authors:*

E-mail: ndchenyu@gmail.com (Y. Chen); zhaoguangtao@snnu.edu.cn (G. Zhao)

‡ These two authors made an equal contribution to this work.

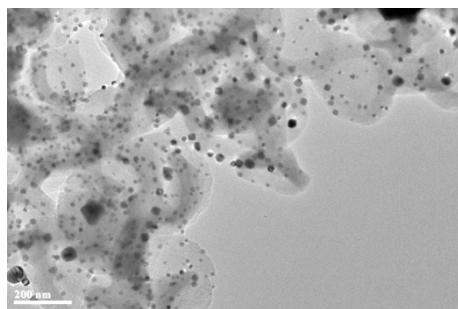


Fig. S1. Low-resolution TEM image of Pd₂Co₁/CNBs nanohybrids.

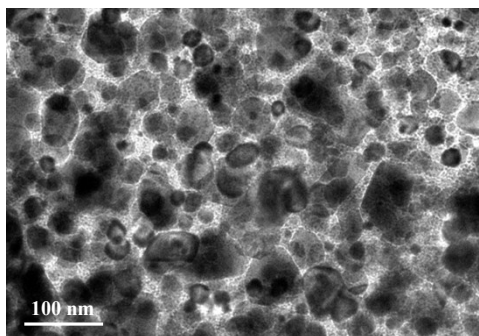


Fig. S2. TEM image of K₂PdCl₄-K₃Co(CN)₆ cyanogel without CNBs after calcined at 650 °C.

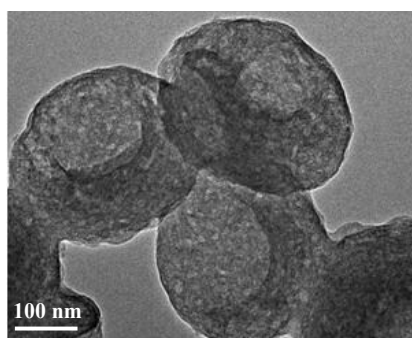


Fig. S3. TEM image of CNBs.

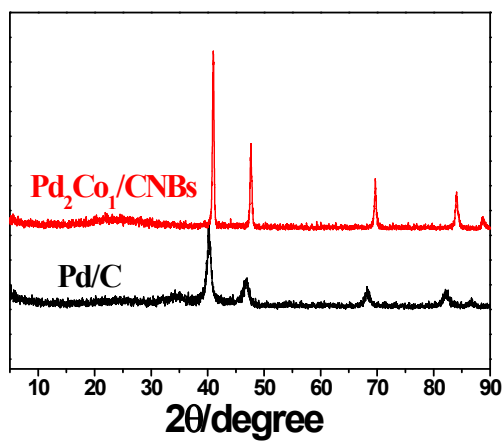


Fig. S4. XRD pattern of Pd₂Co₁/CNBs nanohybrids and commercial Pd/C electrocatalyst.

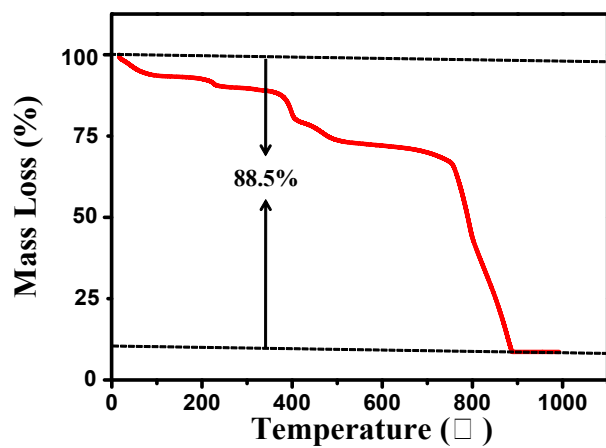


Fig. S5. TGA curve of Pd₂Co₁/CNBs nanohybrids.

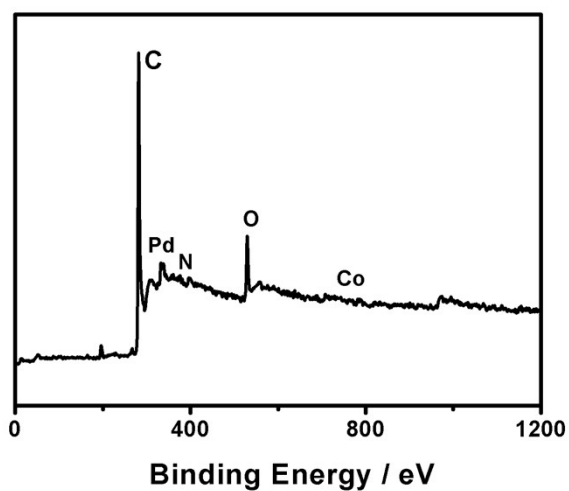


Fig. S6. XPS spectrum of Pd₂Co₁/CNBs nanohybrids.

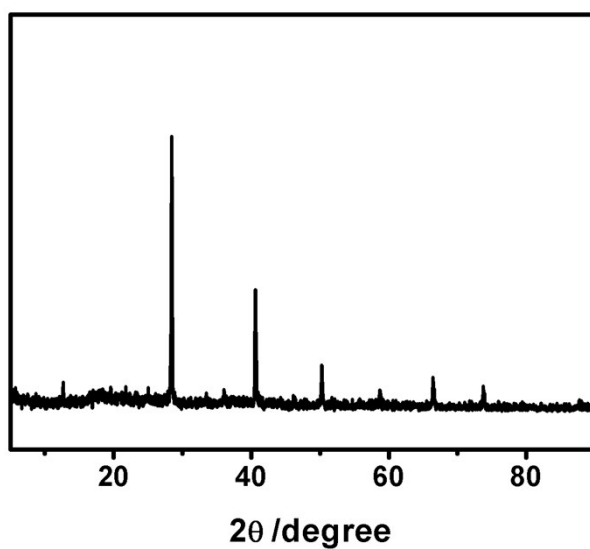


Fig. S7. XRD pattern of K₂PdCl₄-K₃Co(CN)₆ cyanogel.

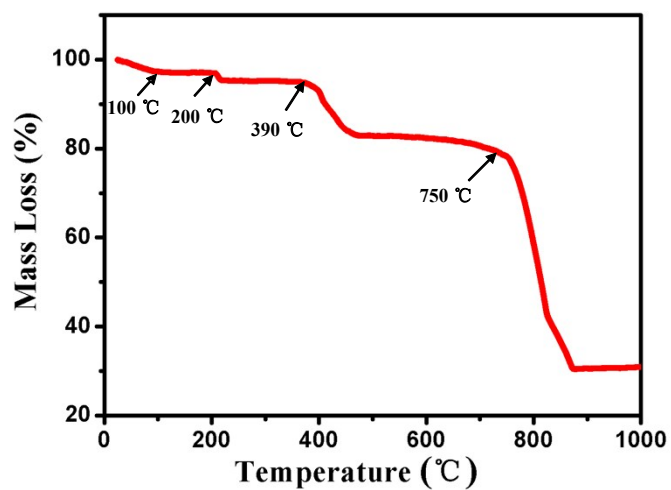


Fig. S8. TGA curve of $K_2PdCl_4-K_3Co(CN)_6$ cyanogel at a heating rate of $5\text{ }^\circ\text{C min}^{-1}$ under N_2 atmosphere.

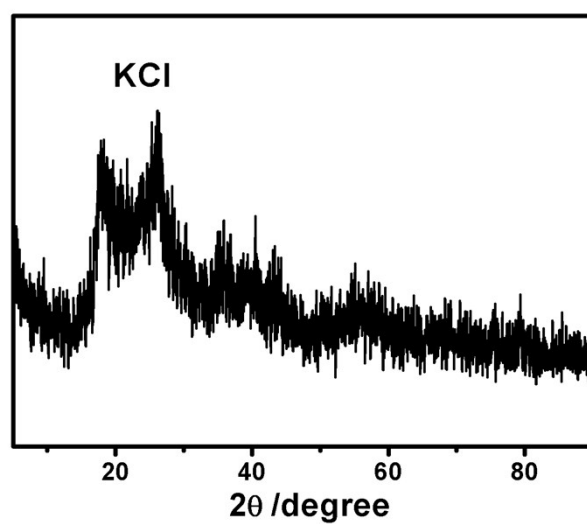


Fig. S9. XRD pattern of $K_2PdCl_4-K_3Co(CN)_6$ cyanogel with CNBs after calcined at 200 °C.

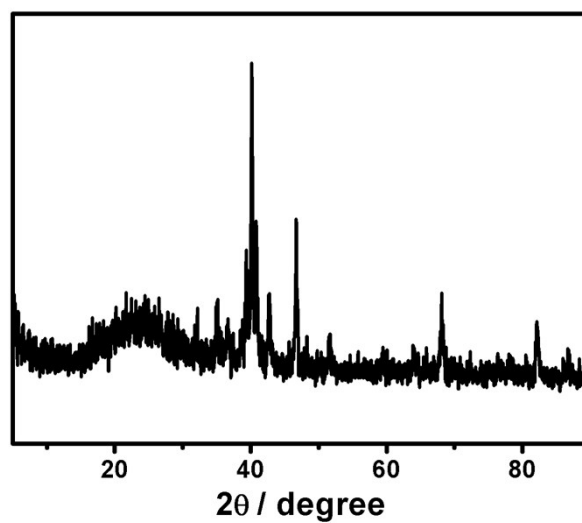


Fig. S10. XRD pattern of K_2PdCl_4 - $K_3Co(CN)_6$ cyanogel with CNBs after calcined at 300 °C.

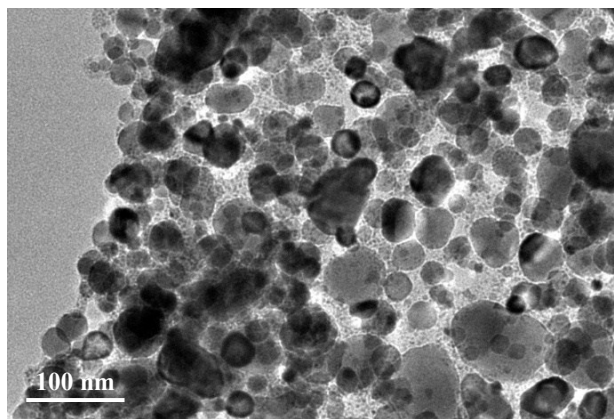


Fig. S11. TEM image of K_2PdCl_4 - $K_3Co(CN)_6$ cyanogel without CNBs after calcined at 300 °C.

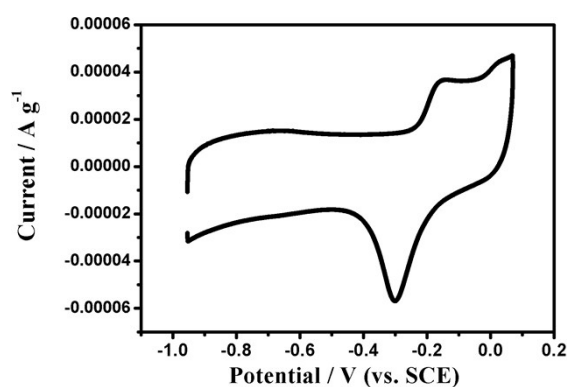


Fig. S12. CV curve of PdCo/CNBs- $NaBH_4$ nanohybrids prepared by conventional $NaBH_4$ reduction method in N_2 -saturated 0.1 m KOH solution at 50 mV s⁻¹.

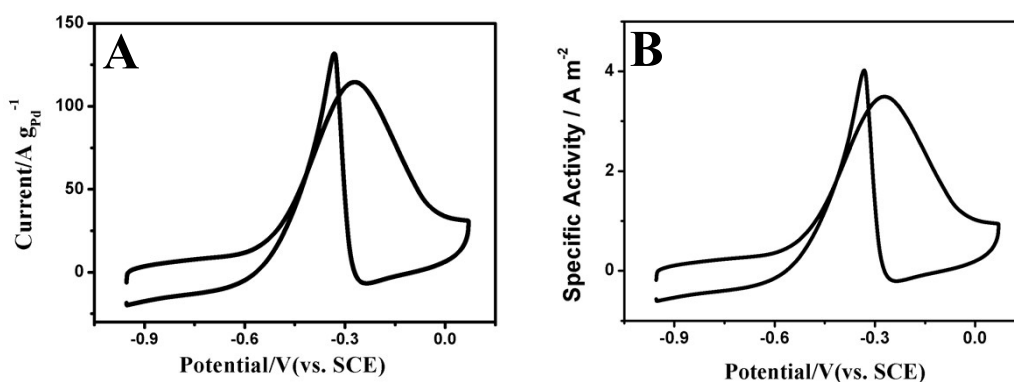


Fig. S13. (A) Mass-normalized and (B) ECSA-normalized CV curves of PdCo/CNBs- $NaBH_4$ nanohybrids prepared by conventional $NaBH_4$ reduction method in N_2 -saturated 0.1 M KOH solution containing 1 M ethanol at 50 mV s⁻¹.

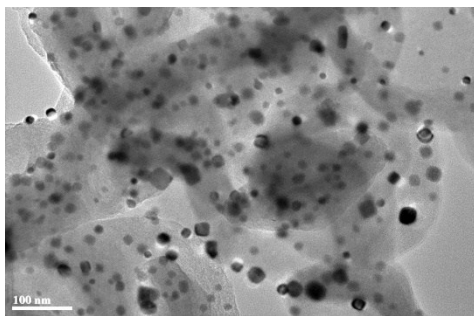


Fig. S14. TEM image of Pd₂Co₁/CNBs after chronoamperometry test.