Supporting Information

Small size Mo_2C nanocrystals coupled with reduced graphene oxide enhance the electrochemical activity of palladium nanoparticles towards methanol oxidation reaction

Chunyong He[a,b], *Juzhou Tao**[a,b], *Guoqiang He*[c] *Pei Kang Shen**[,c] Yongfu Qiu[d]

[a] Institute of High Energy Physics, Chinese Academy of Sciences (CAS), Beijing 100049, China

[b] Dongguan Neutron Science Center, Dongguan 523803, China

[c] Collaborative Innovation Center of Sustainable Energy Materials, Guangxi University, Nanning, Guangxi, 530004, PR China

[d] College of Chemistry and Environmental Engineering, Dongguan University of Technology, Guangdong 523808, P. R. China

E-mail: taoj@ihep.ac.cn; hechunyong@ihep.ac.cn; pkshen@gxu.edu.cn

Keywords: Small size, Mo_2C nanocrystals, Electrocatalyst, Methanol Oxidation Reaction, Direct Methanol Fuel Cells

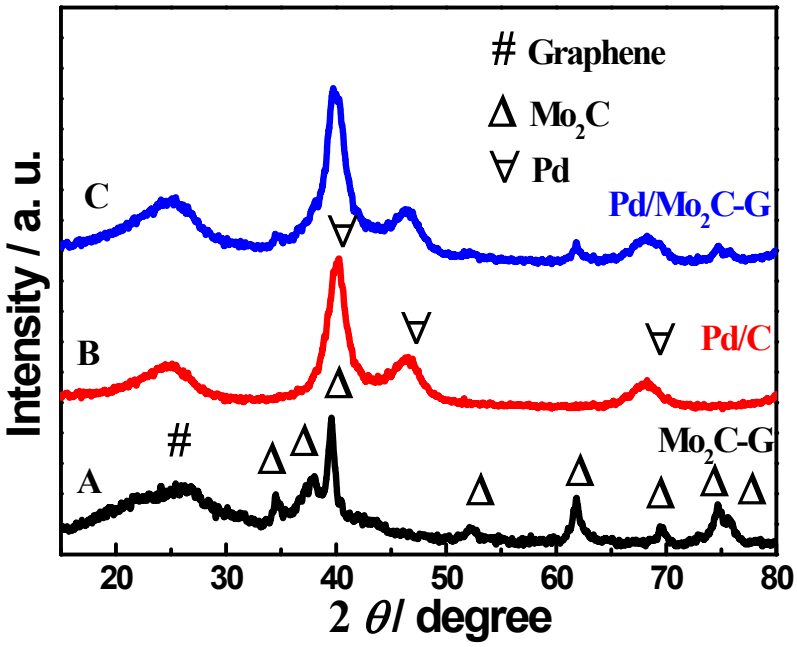

Figure S1 The XRD pattern of Mo_2C-RGO, Pd/C and Pd/Mo_2C-RGO.

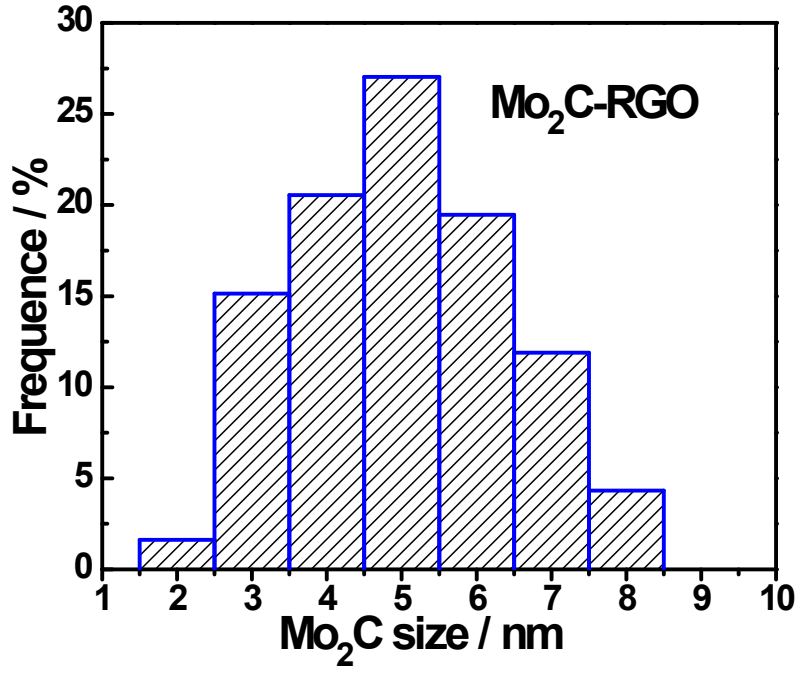

Figure S2 Size-distribution histograms of the Mo_2C-RGO nanosheets.

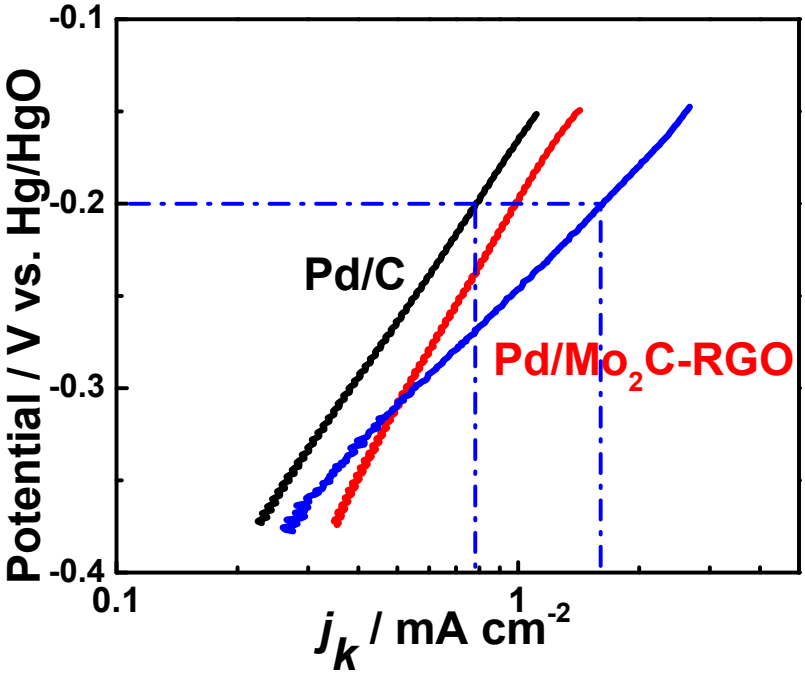

Figure S3 The comparison of specific activities (j_k) of Pd/C and Pd/Mo_2C-RGO. The Pd/Mo_2C-RGO (1.59 mA cm^{-2}) exhibits about twice enhancement in specific activity compared to the Pd/C (0.78 mA cm^{-2}), and 1.6 time of Pd/G (0.98 mA cm^{-2}) at -0.2 V (*vs.* Hg/HgO).

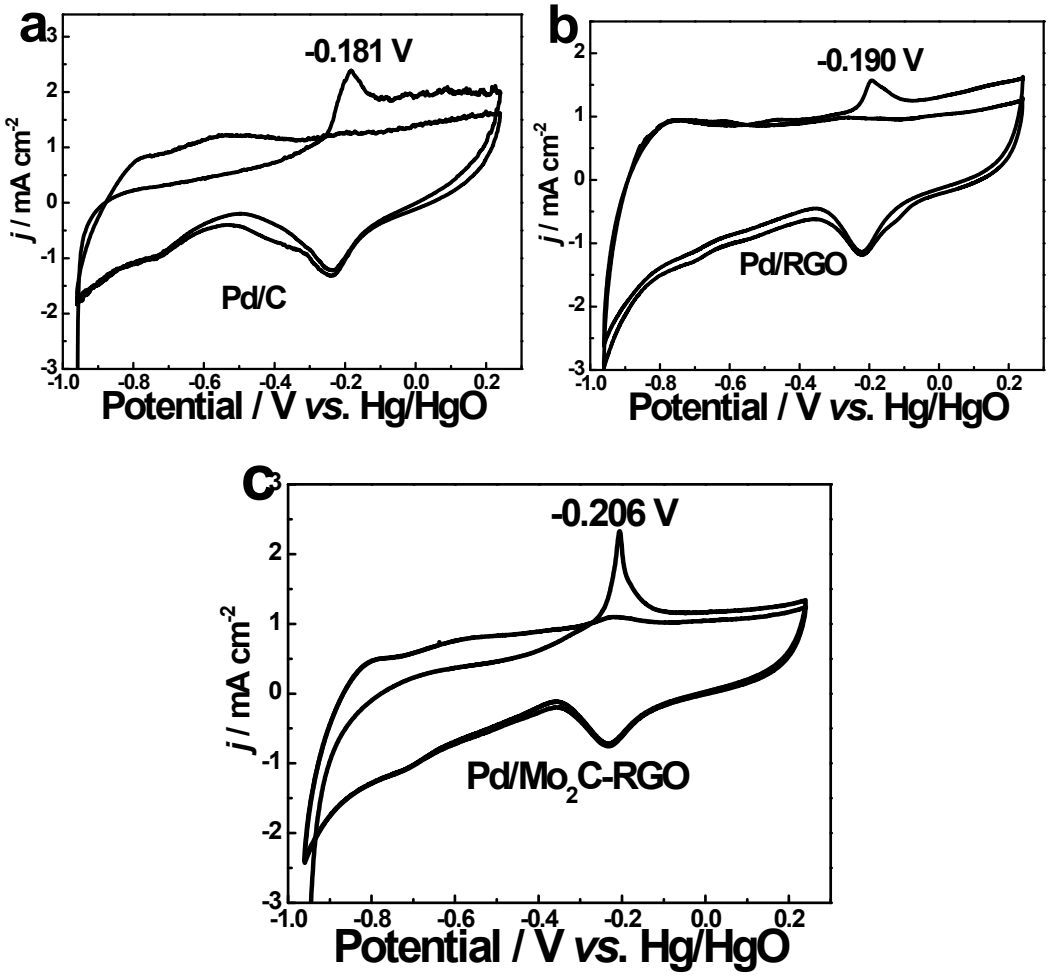

Fig. S4 CO-stripping of Pd/C (a), Pd/RGO (b) and Pd/Mo_2C-RGO (c) in 1.0 mol L^{-1} KOH solution.

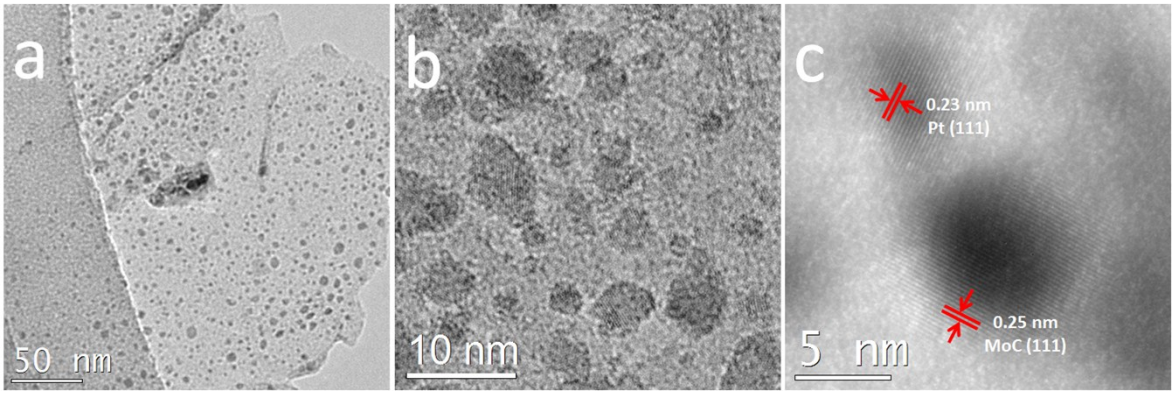

Fig. S5 (a,b) TEM images of Pd/Mo_2C-RGO after ADT test (2000 cycles), (c) HRTEM image of Pd/Mo_2C-RGO after stablity test.