

Hierarchically multifunctional integrated catalyst with intimate and synergistic active sites for one-pot tandem catalysis

Yao Yao,^{a,b} Kexin Huang,^a Yi Liu,^{*c} Tingting Luo,^b Ge Tian,^b Jiaxin Li,^{a,b} Song Zhang,^b Ganggang Chang^{*a} and Xiaoyu Yang^b

^a School of Chemistry, Chemical Engineering and Life Science, Wuhan University of Technology, Wuhan 430070, Hubei, China

^b State Key Laboratory of Advanced Technology for Materials Synthesis and Processing, Wuhan University of Technology, 122, Luoshi Road, Wuhan 430070, Hubei, China

^c School of Mechanical and Electronic, Engineering Wuhan Donghu University, Wuhan 430212, Hubei, China

E-mail: changgang2016@whut.edu.cn (Ganggang Chang);
liuyiwoei@163.com (Yi Liu)

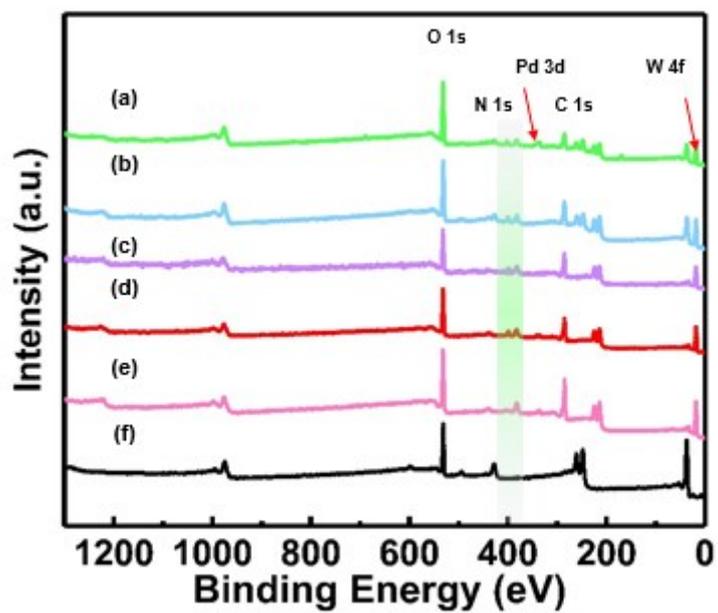


Fig. S1 Survey spectra of (a) 0.86 wt% Pd@HPW@HP-UiO-66-NH₂, (b) HPW@HP-UiO-66-NH₂, (c) HP-UiO-66-NH₂, (d) Pd@HP-UiO-66-NH₂, (e) Pd@UiO-66, (f) HPW.

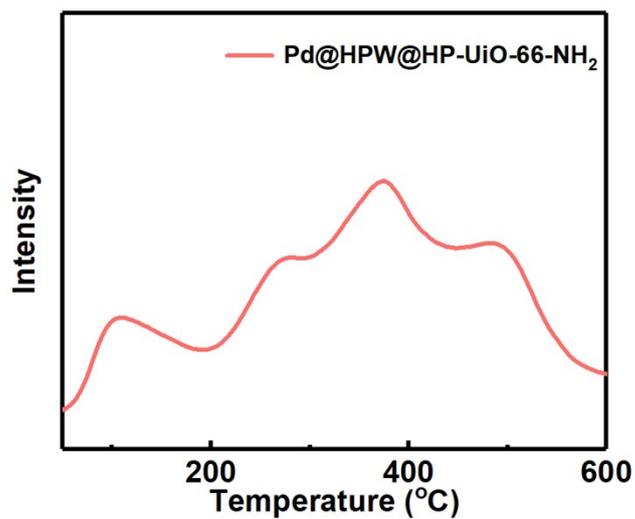


Fig. S2 NH₃-TPD of 0.86 wt% Pd@HPW@HP-UiO-66-NH₂. NH₃-TPD experiment was performed on a home-made TPD apparatus. The sample was pretreated at 573 K for 1 h, adsorbed at 300 K for 0.5 h, and then purged with argon gas to remove the NH₃. The desorption process started from 200 K to 600 K at a heating rate of 10 K/min.

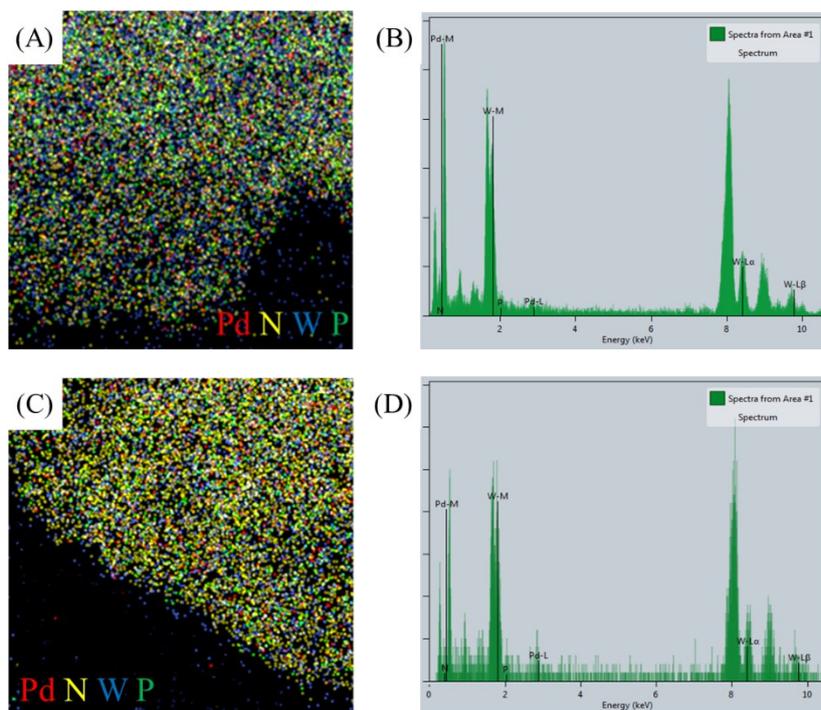


Fig.S3 (A-B) EDX elemental mapping of 0.86 wt% Pd@HPW@HP-UiO-66-NH₂; (C-D) EDX elemental mapping of 0.86 wt% Pd@HPW@HP-UiO-66-NH₂ after 5 runs.

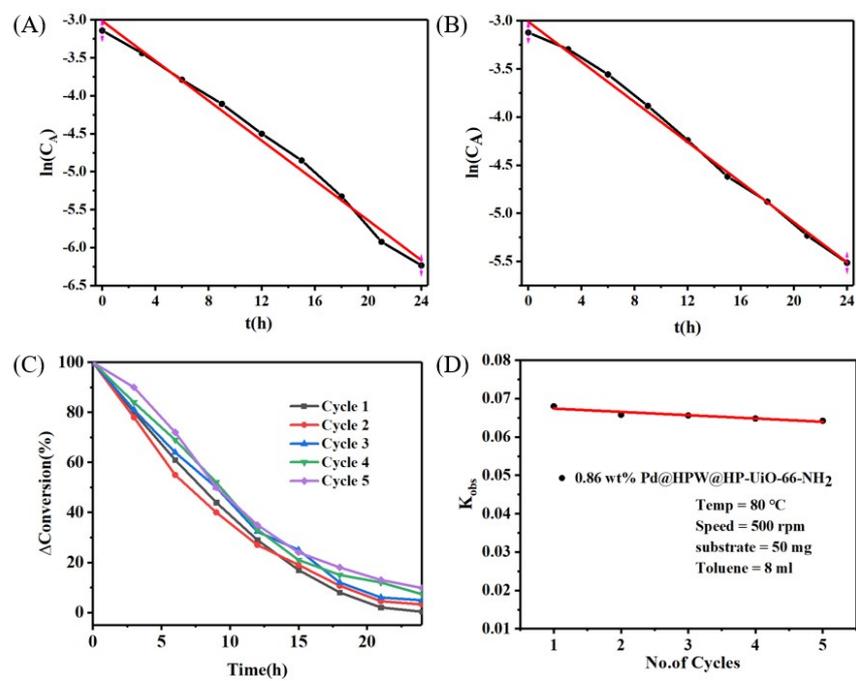


Fig.S4 First-order reversible reaction kinetics plot for (A) the first catalytic cycle, (B) the fifth catalytic cycle and (C-D) kinetic study of catalyst deactivation.