Electronic Supplementary Material (ESI) for Catalysis Science & Technology.

Catalytic activity of shaped platinum nanoparticles for hydrogenation: a kinetic study

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Table S1. L-H models of the different controlling mechanism for 4-nitrophenol (4-NP) reduction by hydrogen

Model No.	Rate model
Single site-molecularly adsorbed 4-NP and molecularly adsorbed H_2	
1	$r_1 = \frac{k_1 C_A}{(1 + K_B^{1/3} C_B)}$
2	$r_1 = \frac{k_1 C_B^{\,3}}{(1 + K_A C_A)^3}$
3	$r_1 = \frac{k_1 K_A K_B C_A C_B^{\,3}}{(1 + K_A C_A + K_B^{1/3} C_B)^4}$
Single site-molecularly adsorbed 4-NP and atomically adsorbed H_2	
4	$r_1 = \frac{k_1 C_B^{\,3}}{(1 + K_B^{1/6} C_B^{1/2})}$
5	$r_1 = \frac{k_1 C_B^{\,3}}{(1 + K_A C_A)^6}$
6	$r_1 = \frac{k_1 K_A K_B C_A C_B^{\,3}}{(1 + K_A C_A + K_B^{1/6} C_B^{1/2})^7}$
Single site-molecularly adsorbed 4-NP and H_2 in the liquid-phase	
7	$r_1 = \frac{k_1 K_A C_A C_B^{\,3}}{(1 + K_A C_A)^4}$
Dual site-molecularly adsorbed 4-NP and molecularly adsorbed H_2	
8	$r_1 = \frac{k_1 K_A K_B C_A C_B^{\,3}}{(1 + K_A C_A)(1 + K_B^{1/3} C_B)^3}$
Dual site-molecularly adsorbed 4-NP and atomically adsorbed H_2	
9	$r_1 = \frac{k_1 K_A K_B^{\,3} C_A C_B^{\,3}}{(1 + K_A C_A)\ \ (1 + K_B^{1/2} C_B^{1/2})^{\ 6}}$

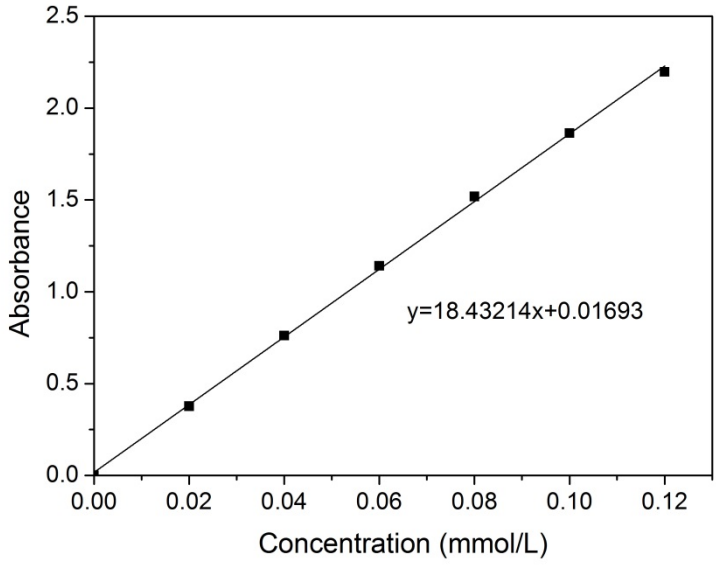

Figure S1. The standard curve of the concentration of 4-nitrophenol versus its absorbance at 400 nm

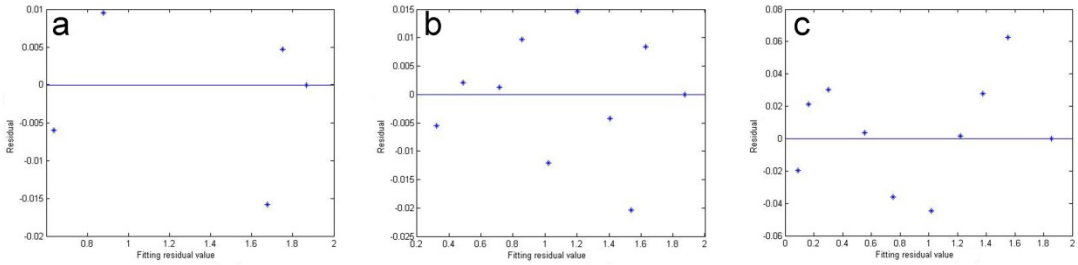

Figure S2. Residual versus 4-nitrophenol absorbance of the fitting of L-H model for cubic Pt(3-HB) NPs at 25 ^{o}C (a), 40 ^{o}C (b), and 70 ^{o}C (c) under 0.4 MPa.

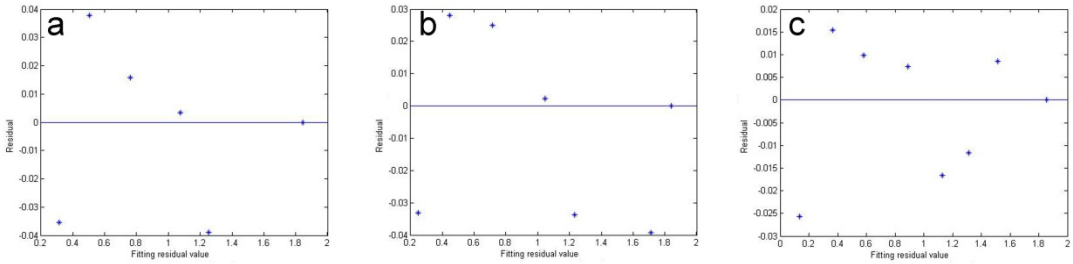

Figure S3. Residual versus 4-nitrophenol absorbance of the fitting of L-H model for *pseudo*-tetrahedral Pt(TA) NPs at 25 °C (a), 40 °C (b), and 70 °C (c) under 0.4 MPa.

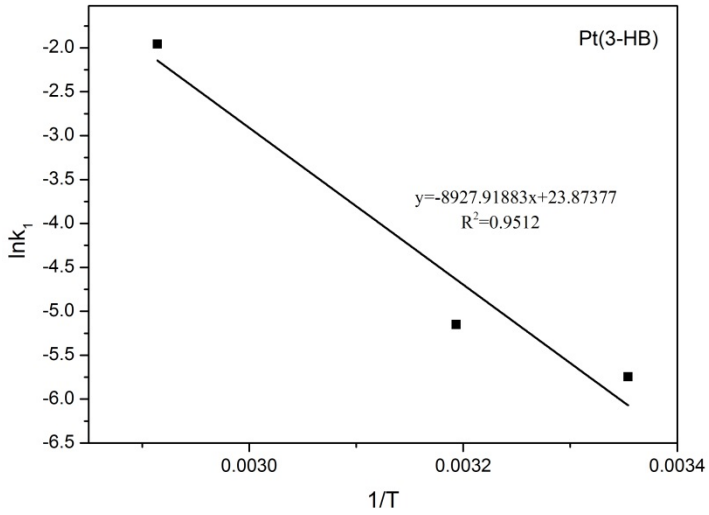

Figure S4. Arrhenius plotting for 4-nitrophenol hydrogenation over cubic Pt(3-HB) NPs under 0.4 MPa

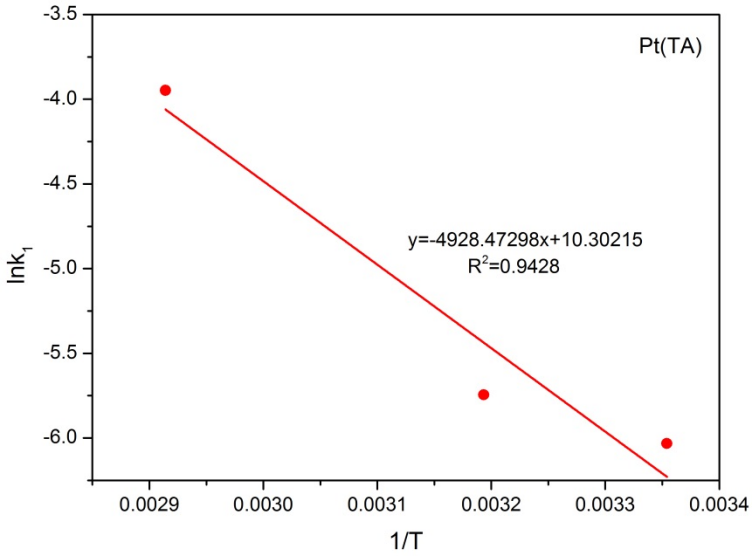

Figure S5. Arrhenius plotting for 4-nitrophenol hydrogenation over *pseudo*-tetrahedral Pt(TA) NPs under 0.4 MPa

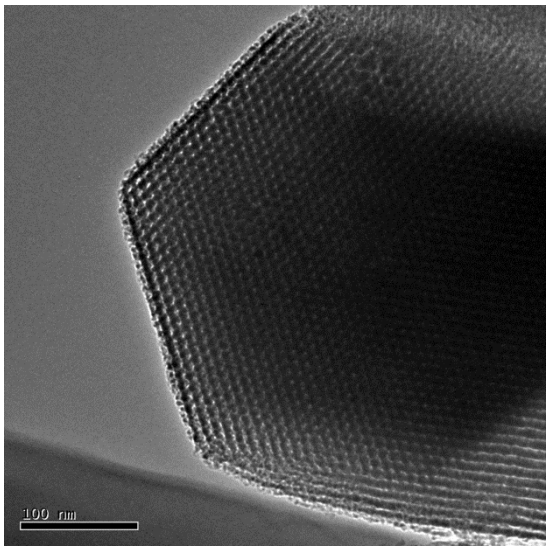

Figure S6. TEM image of the initial SBA-15.

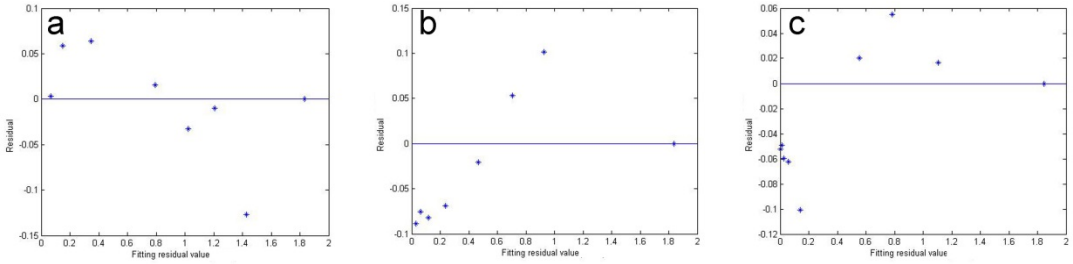

Figure S7. Residual versus 4-nitrophenol absorbance of the fitting of L-H model for Pt(3-HB)/SBA-15 at 26 ^{o}C (a), 40 ^{o}C (b), and 55 ^{o}C (c) under 0.4 MPa.

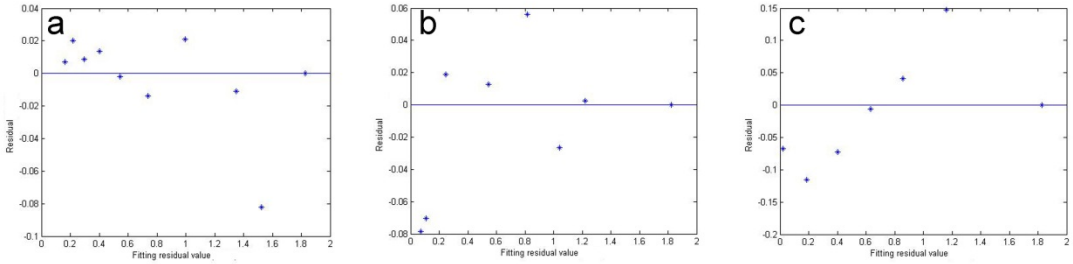

Figure S8. Residual versus 4-nitrophenol absorbance of the fitting of L-H model for Pt (TA)/SBA-15 at 27 ^{o}C (a), 40 ^{o}C (b), and 55 ^{o}C (c) under 0.4 MPa.

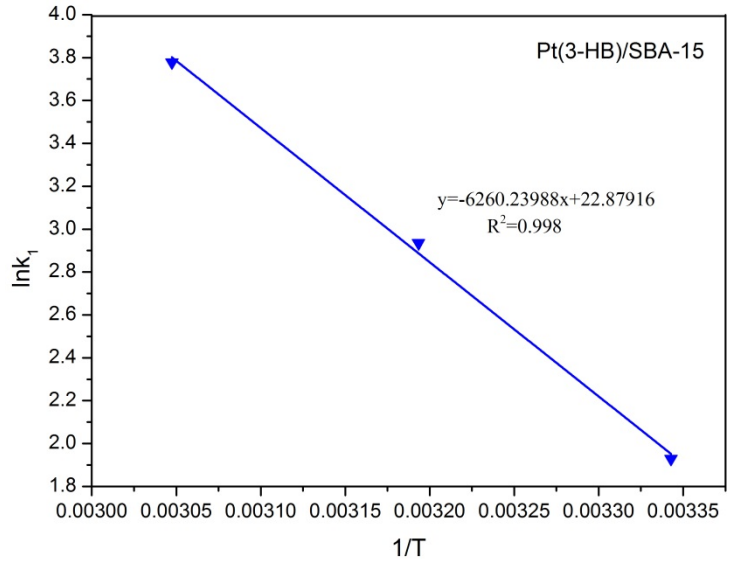

Figure S9. Arrhenius plotting for 4-nitrophenol hydrogenation over Pt(3-HB)/SBA-15 under 0.4 MPa

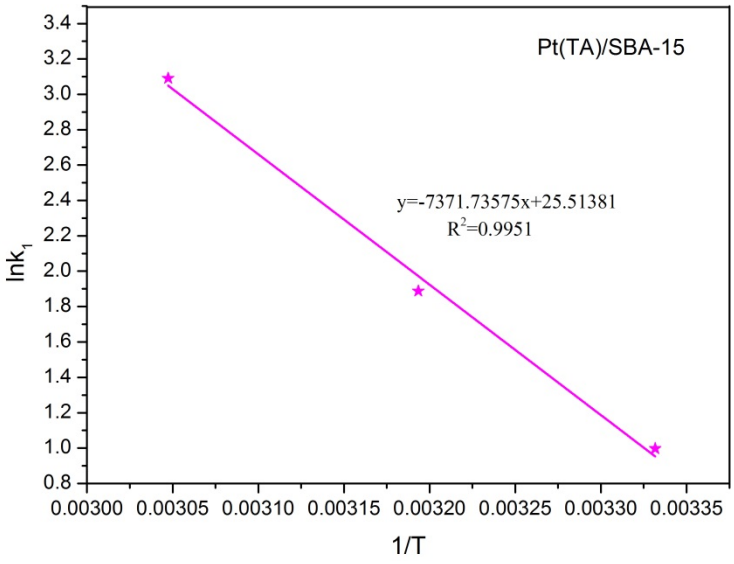

Figure S10. Arrhenius plotting for 4-nitrophenol hydrogenation over Pt(TA)/SBA-15 under 0.4 MPa