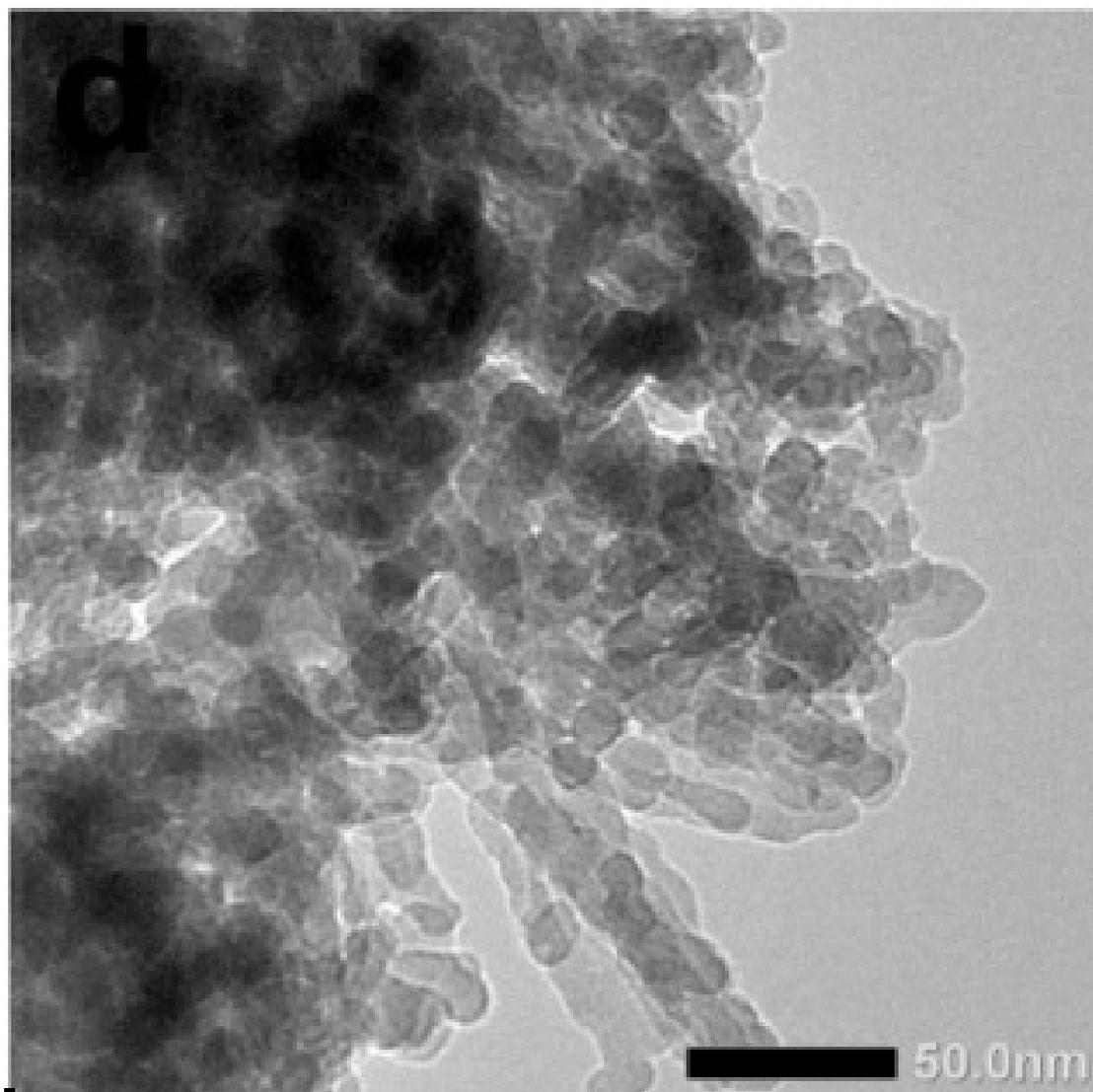
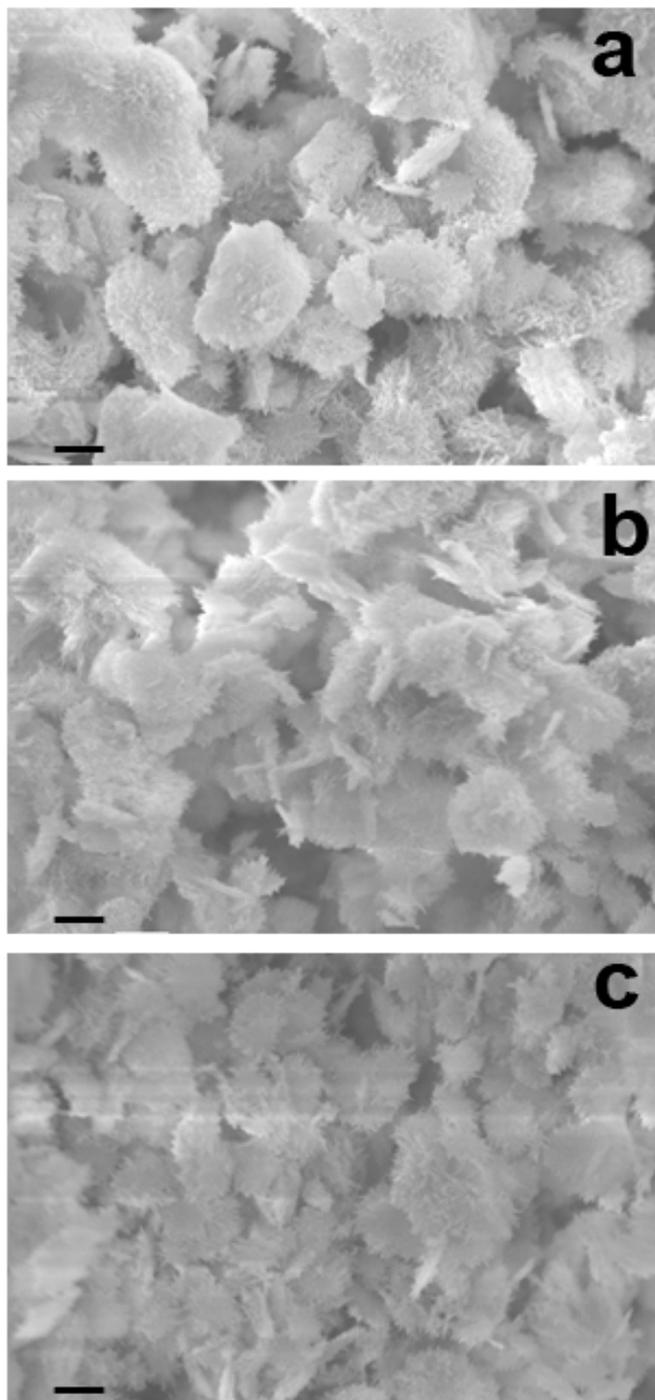


## Supporting Information

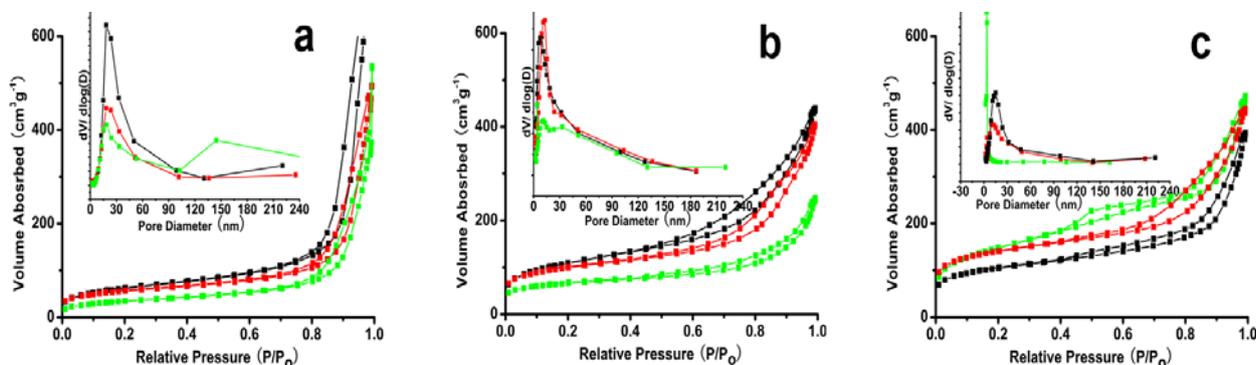
**Figure S1.** TEM images of LPEI@SiO<sub>2</sub> obtained via process-IV with the conditions of 10 g of 5 wt % LPEI, 50 g of crushed ice and 10 mL of 20 vol % MS-51.



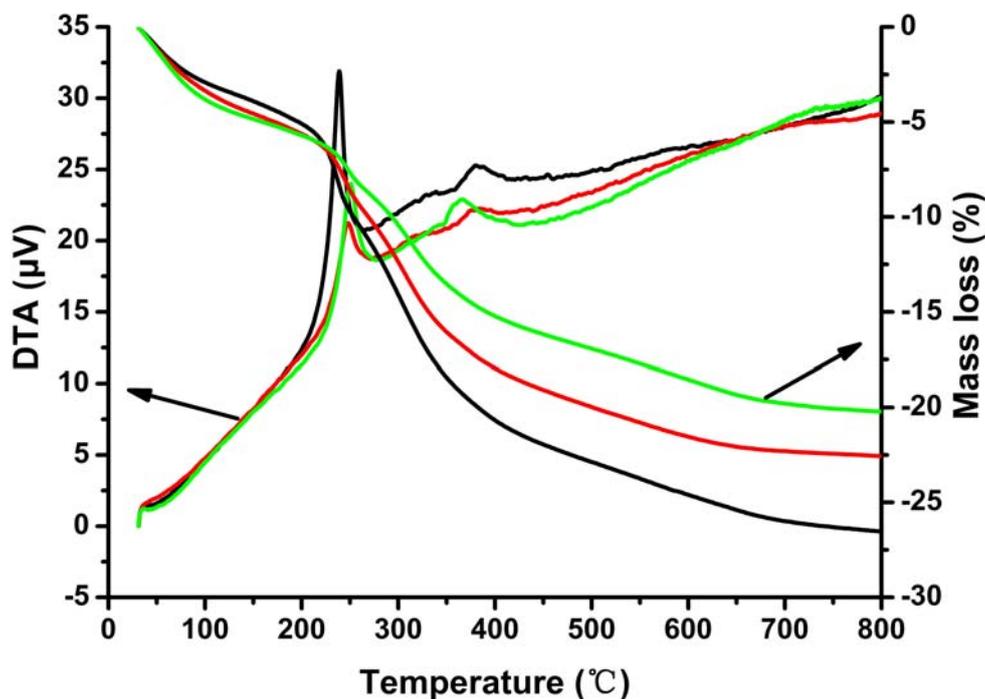
**Figure S2.** SEM images of LPEI@SiO<sub>2</sub> obtained under different concentrations of MS-51 (10 mL) by fixing 10 g of 2 wt % LPEI in Process-II ( $m_{ice} = 10$  g). (a) 10 vol %; (b) 20 vol %, (c) 30 vol %. Scale bars: 2.5  $\mu$ m.



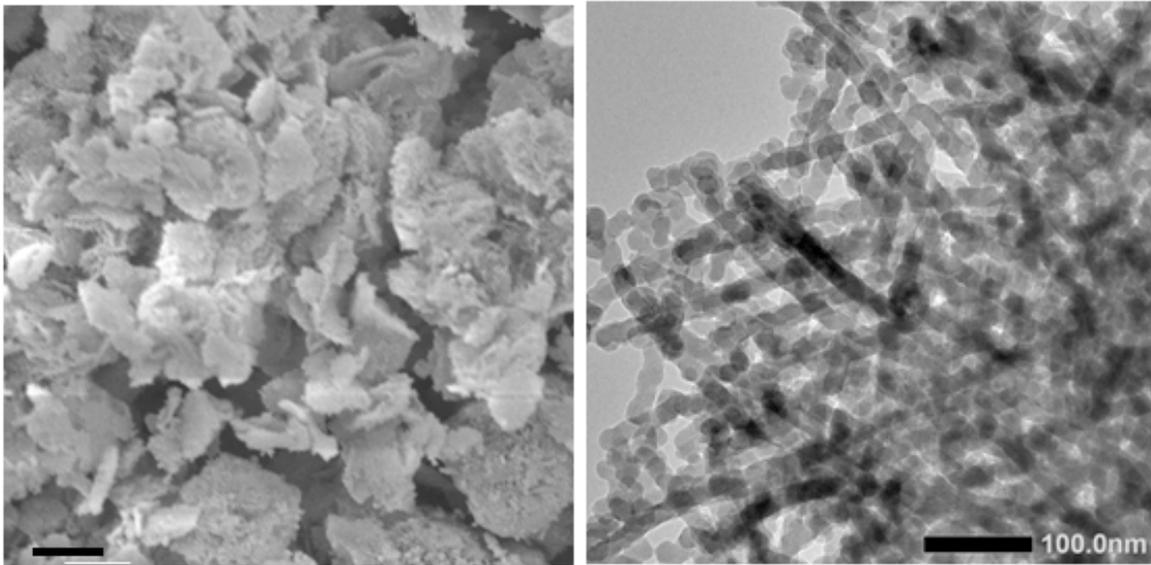
**Figure S3.** N<sub>2</sub> absorption-desorption isotherms of the calcined silica and the corresponding pore sizes distribution curves (by BJH, inserts) under different concentrations of LPEI and MS-51 in Process-II ( $m_{ice} = 10$  g). (a) 2 wt % LPEI; (b) 5 wt % LPEI; (c) 10 wt % LPEI. Black line: 10 vol % MS-51; Red line: 20 vol % MS-51; Green line: 30 vol % MS-51.



**Figure S4.** TGDTA curves of LPEI@SiO<sub>2</sub> obtained under different concentrations of MS-51 by fixing 2 wt % LPEI in Process-II ( $m_{ice} = 10$  g). Black line: 10 vol %; Red line: 20 vol %; Green line: 30 vol %.



**Figure S5.** The SEM image (left, scale bar: 2.5  $\mu\text{m}$ ) and TEM image (right) of the sample obtained under the conditions:  $m_{\text{ice}} = 160$  g, 100 g of 5 wt % LPEI solution, 100 mL of 30 vol % MS-51 solution.



**Figure S6.** The X-ray powder diffraction (XRD) pattern of the sample of Pt loaded LPEI@SiO<sub>2</sub>.

