Electronic Supplementary Information

Facile Immobilization of Enzyme on Three Dimensionally Ordered Macroporous Silica via a Biomimetic Coating

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Determination of immobilized conditions

5 mg of 3DOM SiO_2 was added to 1 mL of NE solution with different concentrations (0.5-2 mg/mL). The mixture was placed under dynamic vacuum and then incubated in a shaking water bath (25 ^oC, 150 r/min) for different time (1-5 h). Then the sample was centrifuged and washed three times with fresh phosphate buffer (0.1 M, pH 7.8). The obtained product was named PN-SiO_2. The obtained PN-SiO_2 was added into 1 mL of PGA solution (0.5-12.5 mg/mL). Then the mixture was incubated at 25 °C for different time (0.5-5 h) with a shaking speed of 130 r/min. After centrifugation, the solid and the supernatant were collected, respectively. The solid was washed three times with the phosphate buffer (0.1M, pH 7.8). The solid was the immobilized PGA and named PGA@PN-SiO_2. The supernatant was used to measure the concentration of the residual PGA to determine the enzyme loading. The results were shown in Fig. S1-3. The optimal immobilized conditions and activity of PGA@PN-SiO_2 were shown in Table S1.

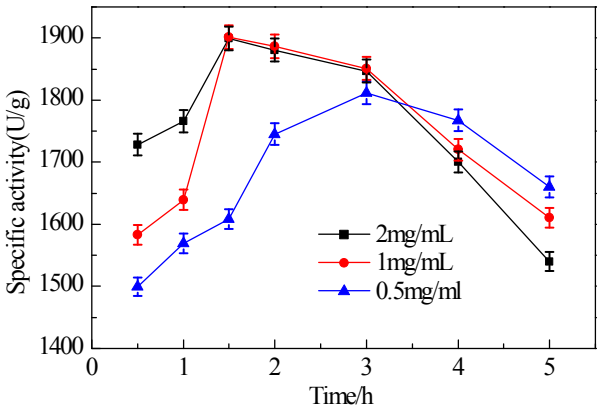

Fig. S1 Effect of NE concentration and modified time on activity of PGA@PN-SiO_2. PGA concentration was 1.25mg/ml and immobilized time was 4 h.

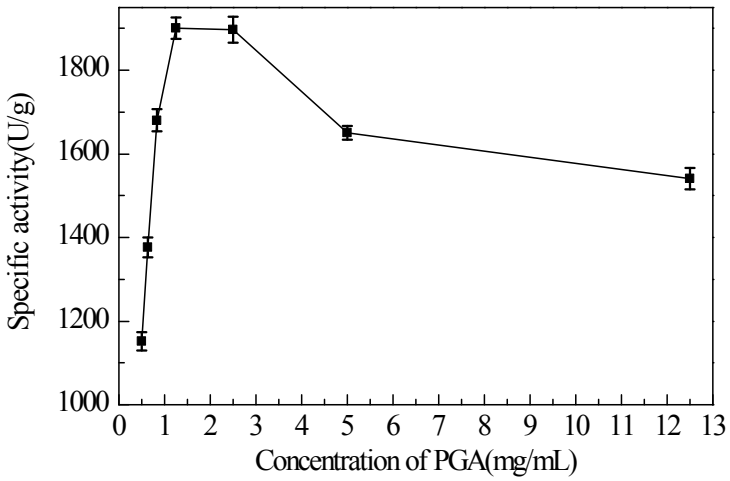

Fig. S2 Effect of PGA concentration on activity of PGA@PN-SiO_2. NE concentration was 1mg/ml and immobilized time was 4 h.

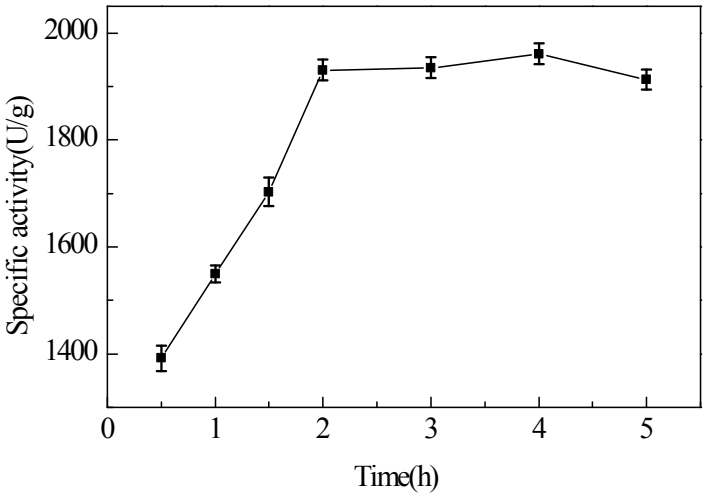

Fig. S3 Effect of immobilizing time on activity of PGA@PN-SiO_2. PGA concentration was 1.25mg/ml and NE concentration was 1mg/ml.

Table S1 The optimal preparation conditions and immobilized yield of PGA@PN-SiO_2

NE concentration (mg/mL)	Modified time (h)	PGA concentration (mg/mL)	Immobilized time (h)	activity(U/mg PGA)	Immobilized yield	Enzyme loading amount(mg/g)
1	1.5	1.25	2	20.31±1.6	58%±3%	95±4.5

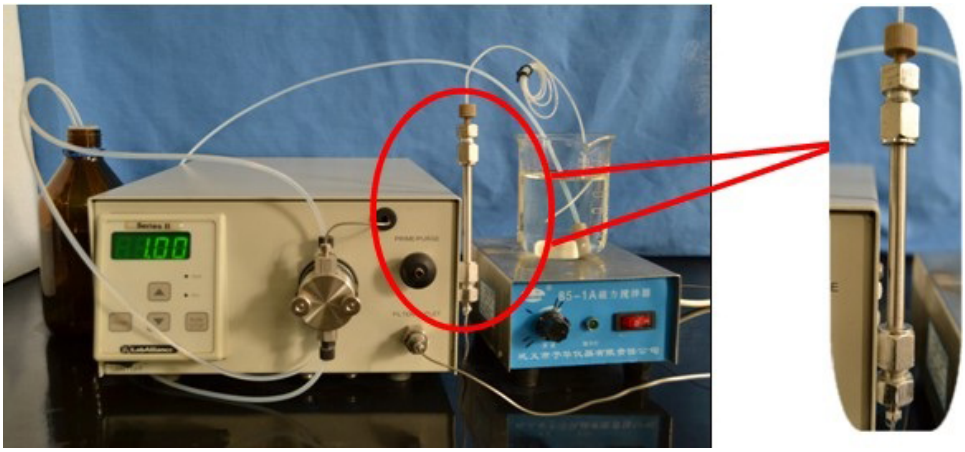

Fig. S4 The experimental setup of the packed bed reactor.

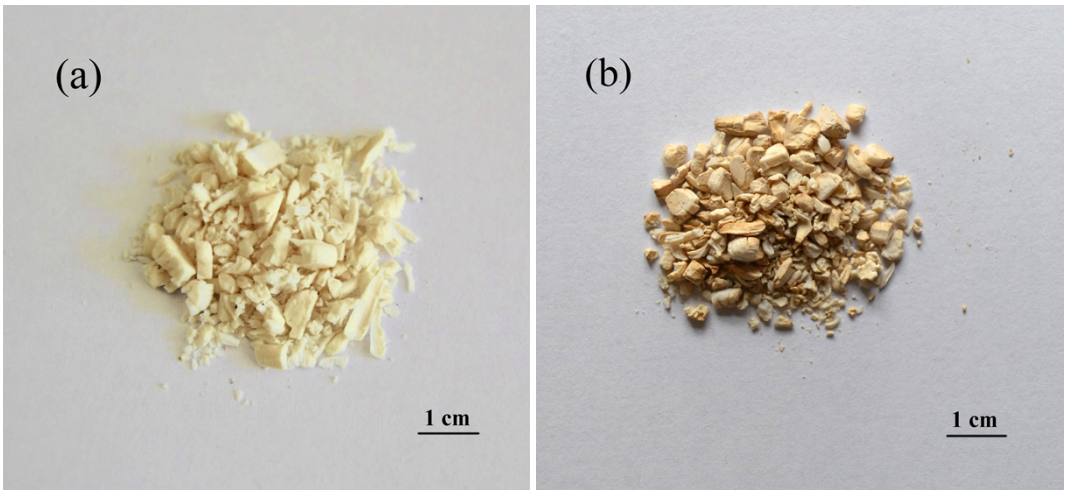

Fig. S5 Photographs of 3DOM silica (a) and PN-SiO_2 (b).