Electronic Supplementary Material (ESI) for RSC Advances

Supporting Information

In this study, the silica nanoparticles solution and the silica nanoparticles solution containing the lipase were lyophilized, respectively. The resultant products were characterized by Transmission electron microscopy (TEM) and Fourier transform infrared spectroscopy (FTIR), respectively.

The TEM images of stacked silica nanoparticles matrices with or without the lipase demonstrated that whether silica nanoparticles solution contained enzyme or not, the stacking of silica nanoparticles always emerged after lyophilization (Fig. 1 and Fig. 2). No obvious difference between the stacked silica nanoparticles with the lipase and the counterpart without the lipase was found in TEM images.

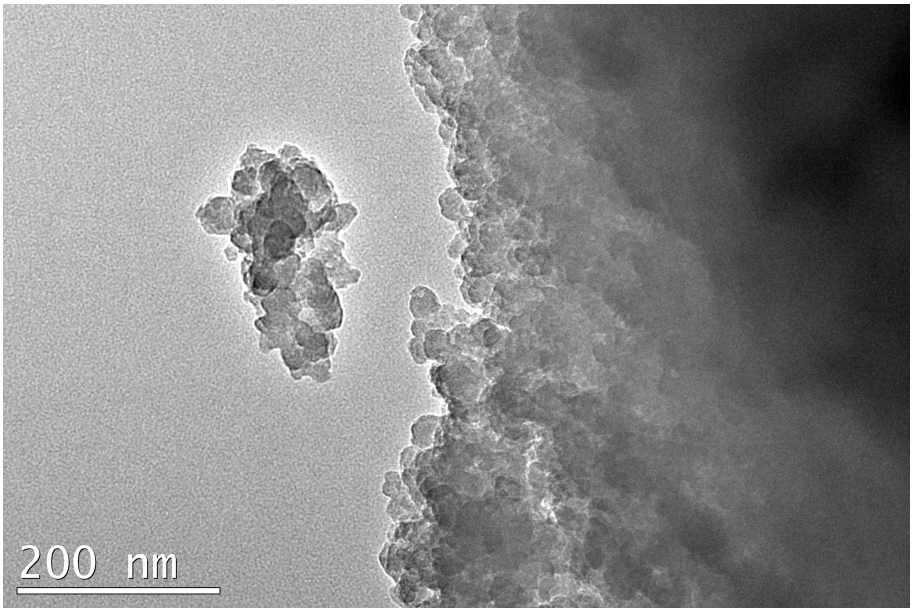

Fig. 1 The stacked silica nanoparticles matrices with the lipase

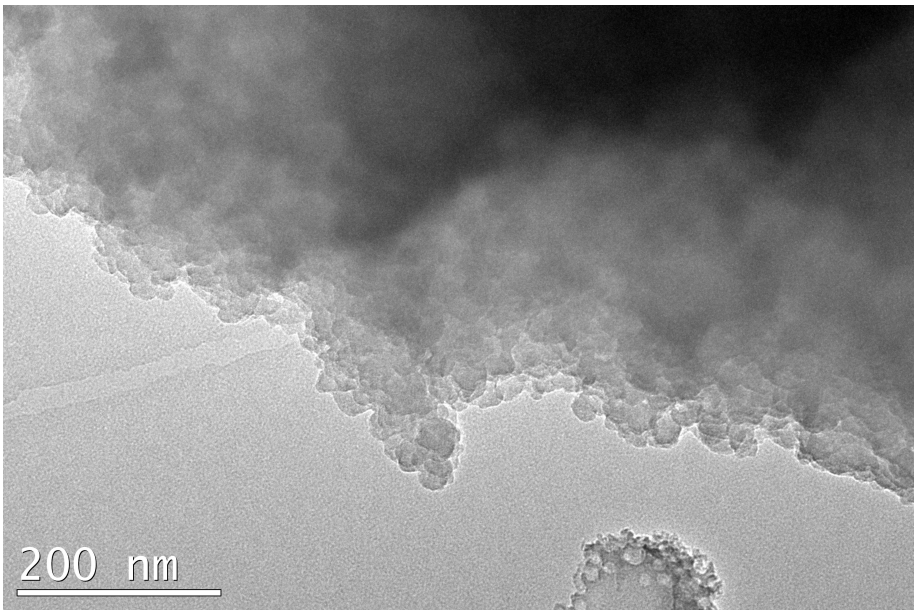

Fig. 2 The stacked silica nanoparticles matrices without the lipase

The stacked silica nanoparticles matrices were added to the lipase solution and stirred at 4 ºC for 4 hours, and then the mixture was centrifuged for 10 min at 5000× g. The precipitate was washed by distilled water. The washing operation was repeated with three times. Then, the precipitate was collected and dried at room temperature for 24 hours. The resulting powder was characterized by FTIR spectrum. No protein adsorption was found in the FTIR spectrum of the powder (Fig, 3). The powder did not exhibit the transesterification activity of the lipase. These results demonstrated that the stacked silica nanoparticles matrices could not strongly adsorb the lipase.

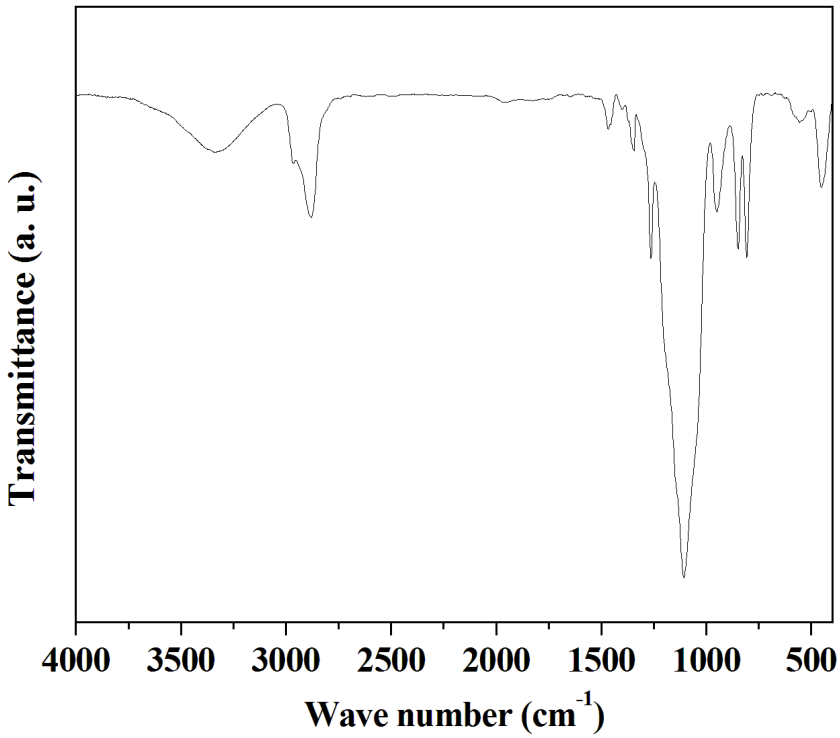

Fig. 3 FTIR spectrum of powder