

Electronic supplementary information (ESI)

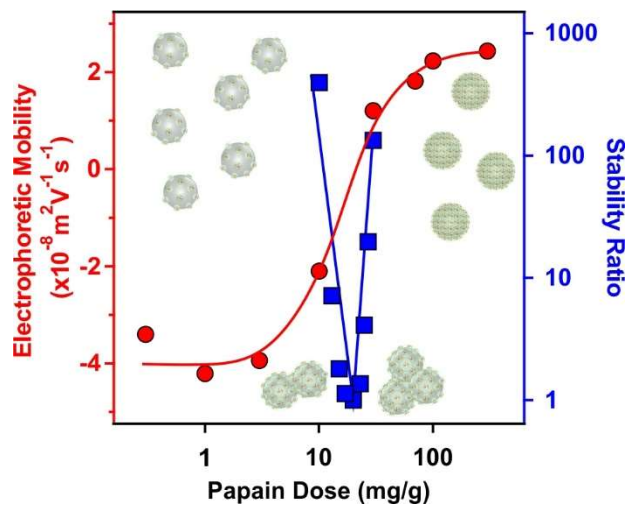
**Development of polymer-based multifunctional composite particles  
of protease and peroxidase activities†**

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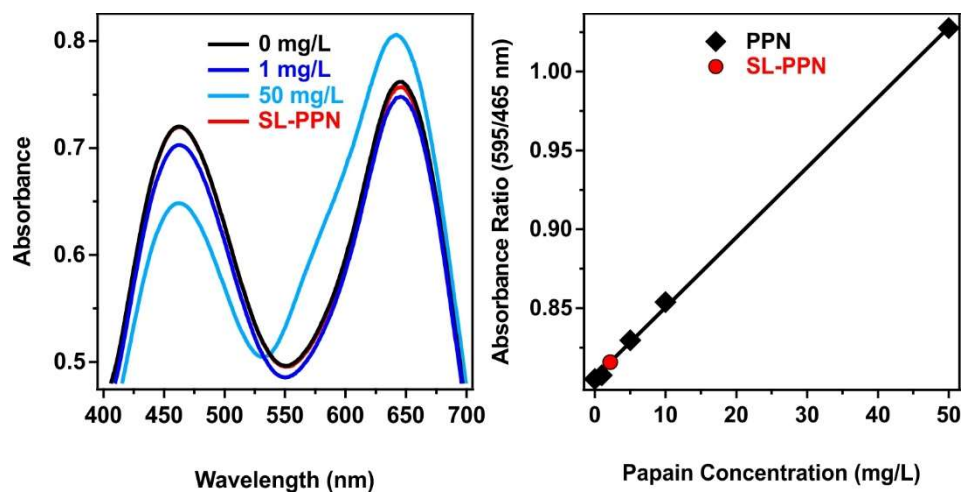
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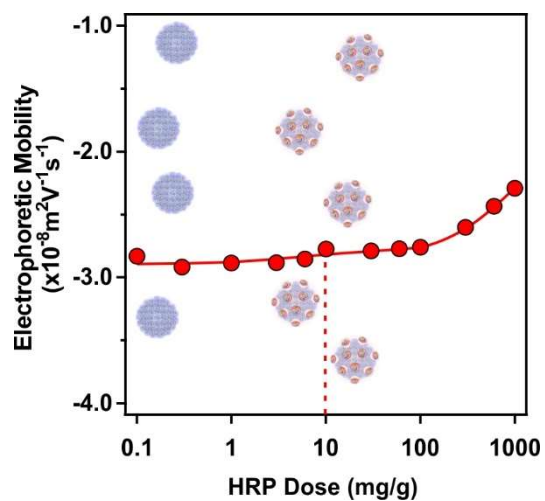
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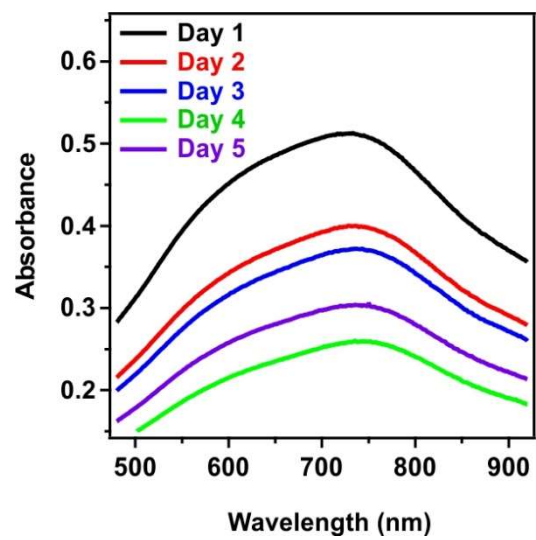
**Fig. S1** Electrophoretic mobility (red circles, left axis) and stability ratio (blue squares, right axis) data of the SL particles as function of the PPN dose. The measurements were carried out at pH 4 and 1 mM ionic strength adjusted by NaCl. The mg/g unit refers to mg of PPN per 1 g of SL. The solid lines serve to guide the eyes.



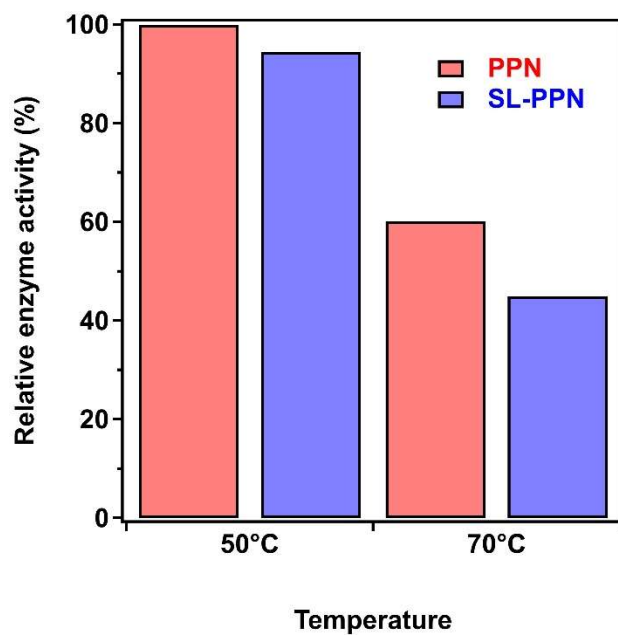
**Fig. S2** (a) Bradford tests for standard solutions of PPN of 1 and 50 mg/L concentrations and for the reference system without enzyme (0 mg/L) as well as for the filtrate after the PPN adsorption on SL (SL-PPN). (b) The ratio of the absorbances recorded at 595 and 465 nm wavelengths shown in (a) as a function of the PPN concentration for the standards (black diamonds) and for the filtrate (red circle).



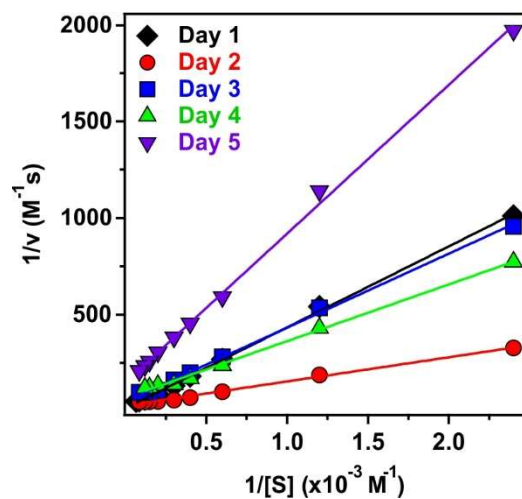
**Fig. S3** Electrophoretic mobility of the SL-PPN-HEP particles as a function of the HRP dose. The measurements were carried out at pH 4 and 1 mM ionic strength adjusted by NaCl. The mg/g unit refers to mg of HRP per 1 g of particles. The solid line serves to guide the eyes, while the dashed line indicates the dose used in the SL-PPN-HEP-HRP hybrid.



**Fig. S4** Time dependent UV-Vis spectra recorded during protease-like activity measurements with the SL-PPN-HEP-HRP composite. The applied PPN concentration was 22.7 mg/L.



**Fig. S5** Relative enzyme activities of PPN and SL-PPN after one hour incubation time at 50 °C and 70 °C. The values were calculated by normalizing to the activities without heat treatment.



**Fig. S6** Lineweaver-Burk plot for the peroxidase activity of the SL-PPN-HEP-HRP hybrid particles determined at different time intervals. The solid line is the Lineweaver-Burk fit used to calculate the  $K_m$  and  $v_{max}$  values. The applied HRP dose was 2.6 mg/L.