

Supporting information

Designing hydrophobically modified polysaccharide derivatives for highly efficient enzyme immobilization

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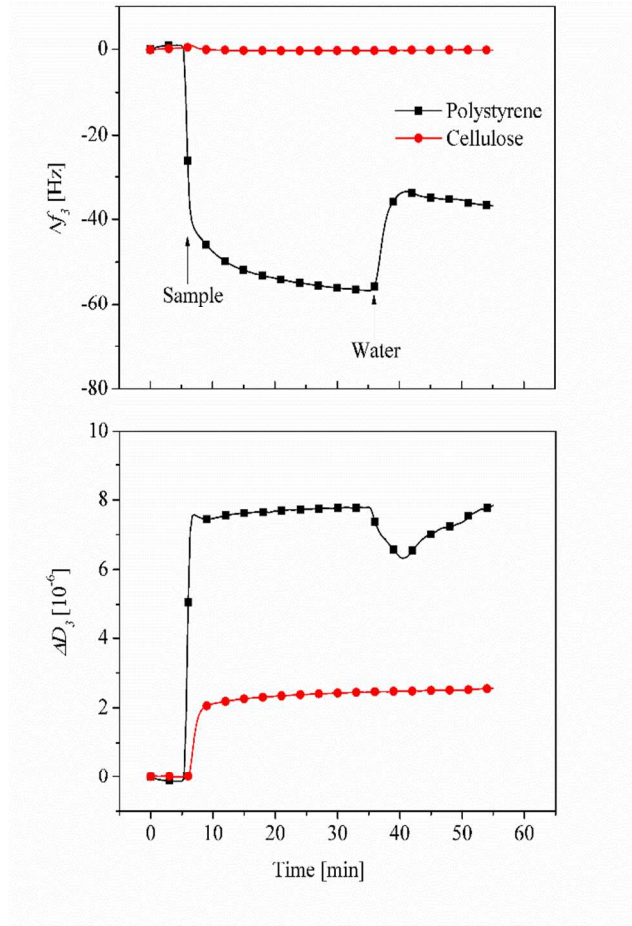


Figure S1: QCM-D measurements showing the Interaction of BCMC with cellulose (red line) and polystyrene (black line).

Calculation of QCM-D wet mass of HRP using Sauerbrey equation

The wet mass of the immobilized HRP enzyme can be calculated using the Sauerbrey equation:

$$\Delta m = C \frac{\Delta f_n}{n} \quad (1)$$

where Δf_n is the observed frequency shift, C is the Sauerbrey constant ($-17.7 \text{ ng Hz}^{-1} \text{ cm}^{-2}$ for a 5 MHz crystal), n is the overtone number ($n = 1, 3, 5$, etc.), and Δm is the change in mass of the crystal due to the adsorbed layer.

Determination of ABTS activity of immobilized HRP

For method I, the BCMC coated and pure PS films ($1 \times 1 \text{ cm}^2$) were placed in 12 well plates. 1 mL of HRP (1 mg mL^{-1} , dissolved in water) was added into the well and incubated for 180 minutes. Afterwards, the HRP solution was exchanged for 1 mL of water for 20 minutes. The films were taken out, rinsed with water and blow dried with nitrogen gas. In method II, 1 mL of an aqueous EDC·HCl, and HRP (both 1 mg mL^{-1} , dissolved in water) were added into the wells and incubated for 180 minutes. Following this, solutions were exchanged for 1 mL of water and incubated for 20 minutes. After this step, the films were removed from the liquid, rinsed with water, and blow dried with nitrogen gas. In method III, 1 mL of EDC·HCl (1 mg mL^{-1} , dissolved in water) was added into the well and incubated for 20 minutes. Following subsequent washing, the EDC·HCl solution was exchanged with 1 mL of HRP solution and incubated for 180 minutes. The HRP solution was exchanged for 1 mL of Milli-Q water and incubated for 20 minutes. Finally, the films were removed from the liquid, rinsed with water and blow dried with nitrogen gas.