

## Supplementary Information

for

Glucose-induced Decomposition of Layer-by-layer Films Composed of Phenylboronic Acid-bearing Poly(allylamine) and Poly(vinyl alcohol) under Physiological Conditions

Katsuhiko Sato, Mao Takahashi, Megumi Ito, Eiichi Abe and Jun-ichi Anzai

---

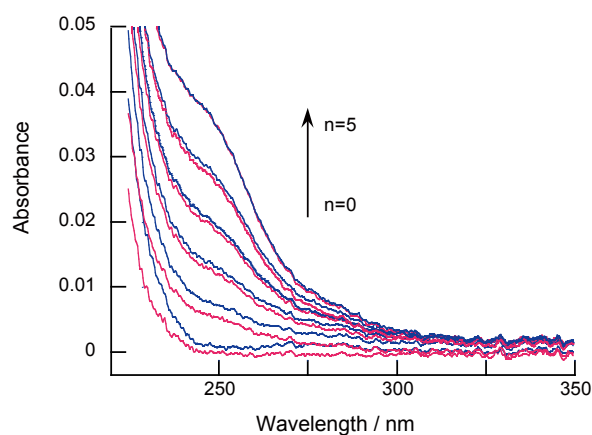


Fig. S1

UV absorption spectra of GOx/(PBA-PAH/PVA)<sub>n</sub> (n=1–5) films.

The multilayer films were deposited on both sides of a quartz slide at pH 7.4 in the manner described in the Experimental Section, and spectra were recorded after each deposition of the materials. The spectra at n=0 represent those for PAH and PAH/GOx films. The UV spectra marked in blue for n=1–5 are those of PBA-PAH-terminated films, while spectra marked in red denote those of PVA-terminated films. The absorption intensity of the films slightly decreased after deposition of PVA for each layers probably due to a slight desorption of PBA-PAH.

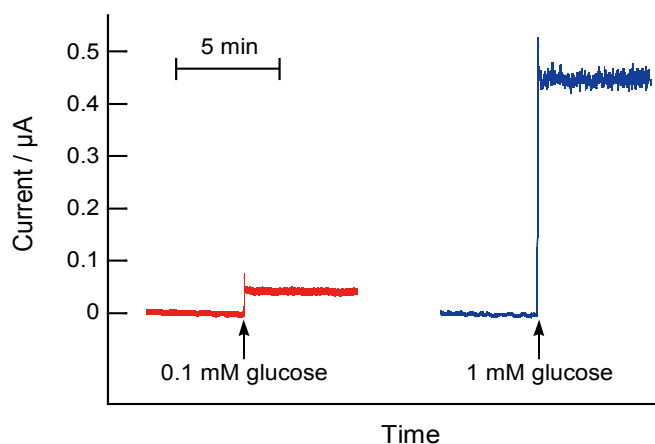
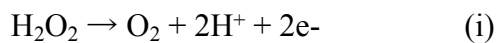


Fig. S2

The kinetics of enzymatic production of  $\text{H}_2\text{O}_2$  in  $\text{GOx}/(\text{PBA-PAH/PVS})_{10}$  film. The oxidation current of  $\text{GOx}/(\text{PBA-PAH/PVA})_{10}$  film-coated electrode was recorded at 0.6 V (vs. Ag/AgCl) upon adding 0.1 and 1 mM glucose in the solution at pH 7.4.

A platinum disk electrode (3 mm diameter) was coated with the multilayer film in a similar manner, and used as working electrode for measuring the electrochemical response to 0.1 and 1 mM glucose. The electrochemical measurements were carried out using a Ag/AgCl electrode and a platinum wire electrode as reference and auxiliary electrodes, respectively. The output current of the electrode, which originates from electro-oxidation of enzymatically produced  $\text{H}_2\text{O}_2$  (Equation i), increased rapidly upon adding glucose and reached a steady state value in several seconds, showing that enzymatic production of  $\text{H}_2\text{O}_2$  in the film is rapid.



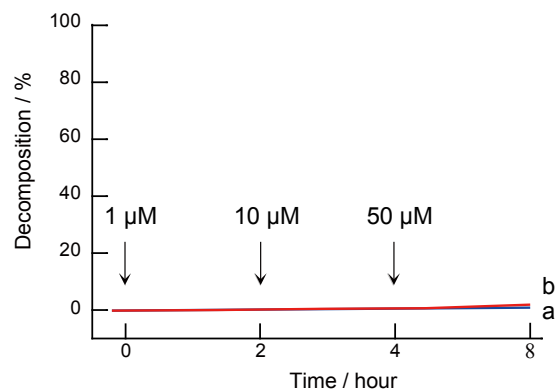


Fig. S3

Stability of GOx/(PBA-PAH/PVA)<sub>5</sub> (a) and GOx/(PBA-PAH/PVA)<sub>10</sub> (b) films in 1, 10, and 50 μM glucose solutions at pH 7.4.

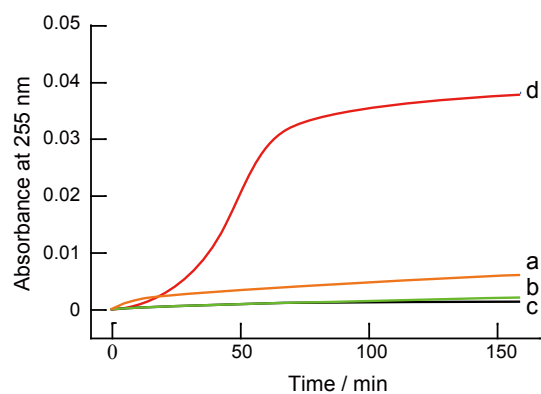


Fig. S4

Stability of GOx/(PBA-PAH/PVA)<sub>10</sub> film in the absence of glucose in aqueous solutions of pH 3.0 (a), 6.0 (b), and 9.0 (c). Curve d shows response of the film to 1 mM glucose at pH 7.4, which is shown as reference.

The multilayer film-coated slide was immersed in the buffer solution, and the absorbance of the solution at 255 nm was monitored under gentle stirring.