Electronic Supplementary Material (ESI) for Polymer Chemistry.

Supplementary Information

for

Synthesis of a Glucose Oxidase-Conjugated, Polyacrylamide-Based, Fluorescent Hydrogel for a Reusable, Ratiometric Glucose Sensor

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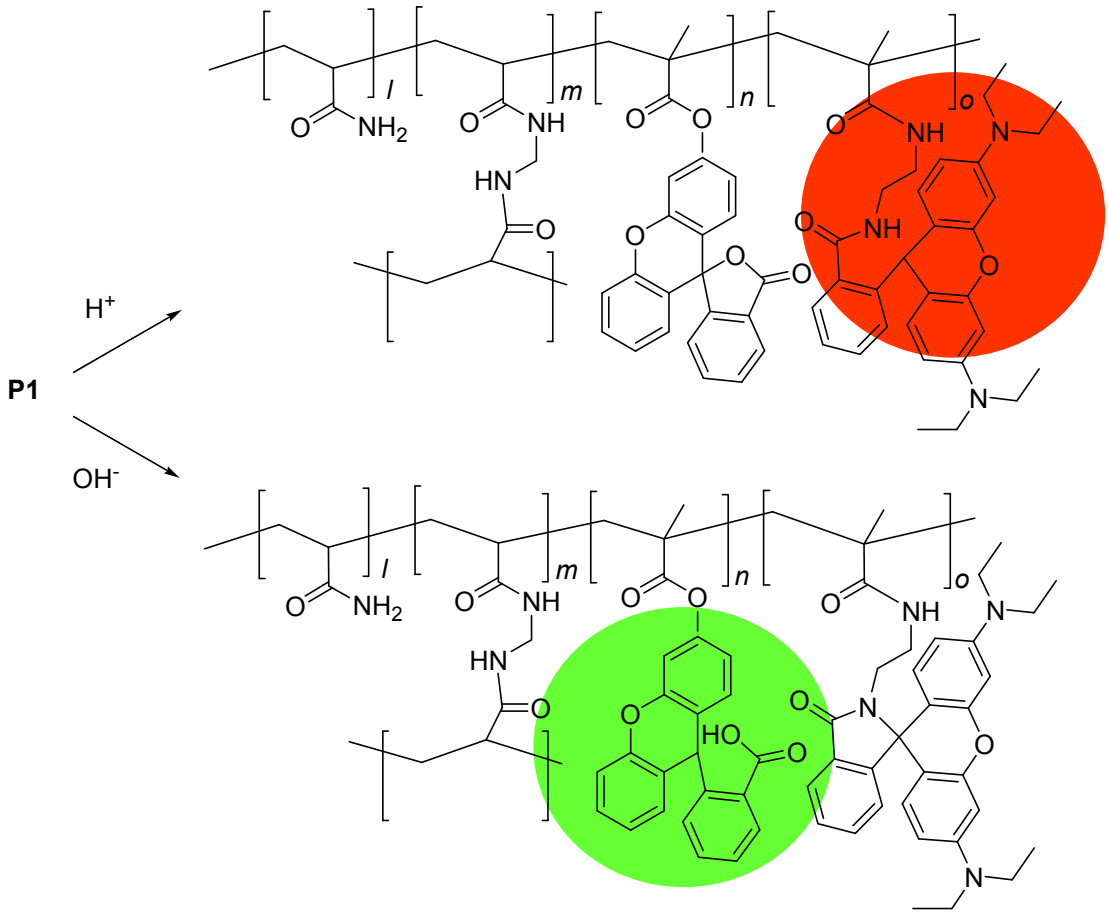
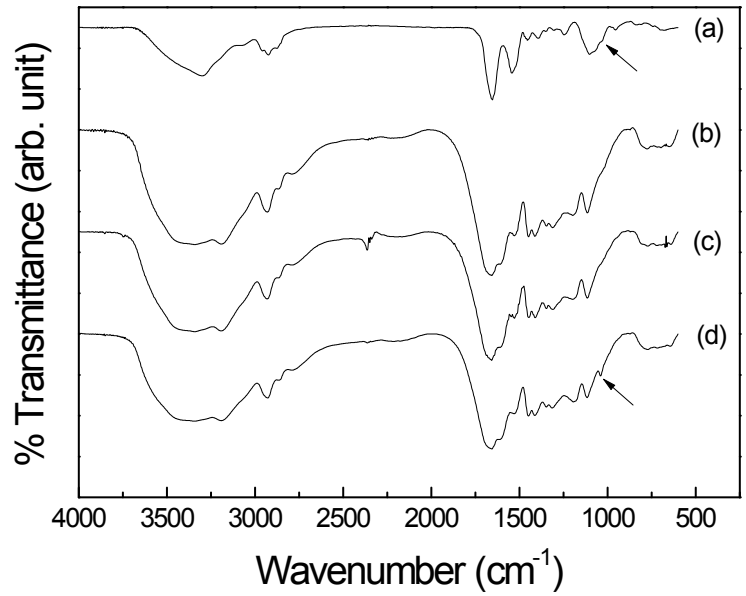
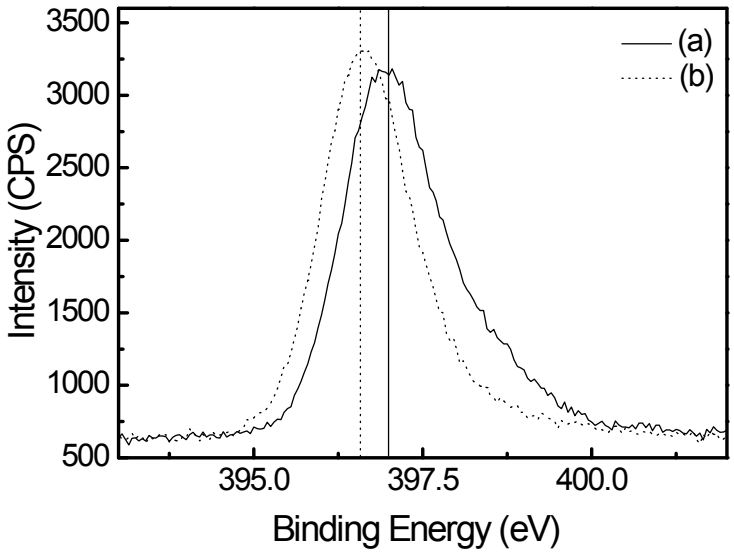


Scheme S1. Changes in structures and emission colors of **P1** under various pHs.

(A)


% Transmittance (arb. unit)
(a)
(b)
(c)
(d)
4000
3500
3000
2500
2000
1500
1000
500
Wavenumber (cm-1)

(B)


Intensity (CPS)
3500
3000
2500
2000
1500
1000
500
(a)
(b)
395.0
397.5
400.0
Binding Energy (eV)

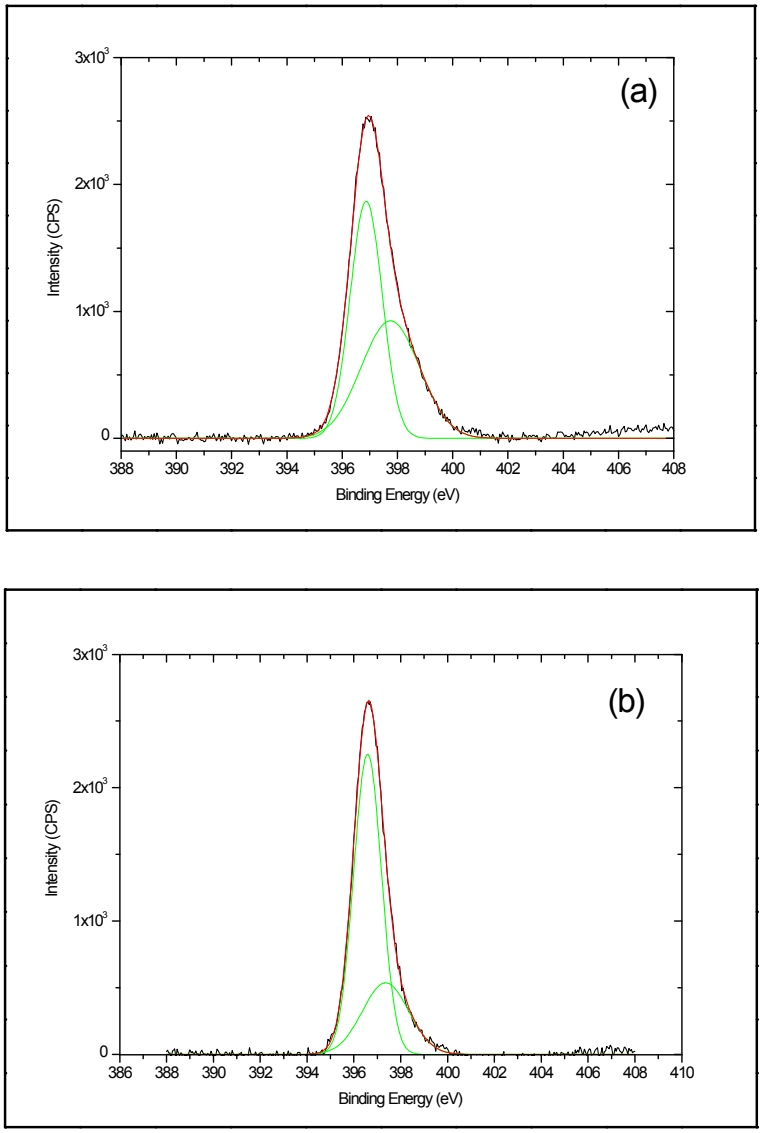
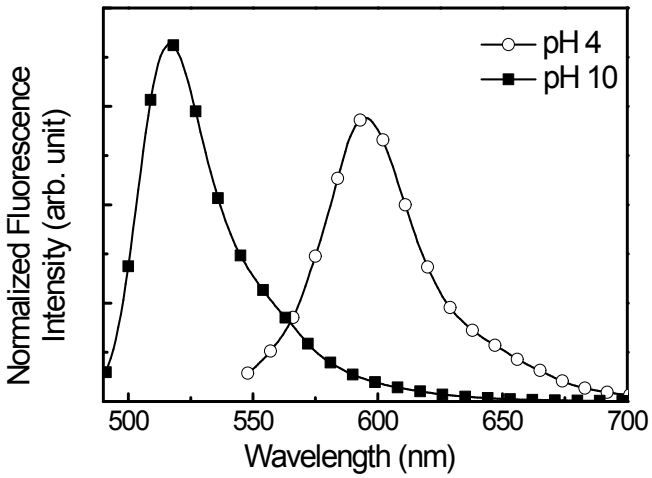
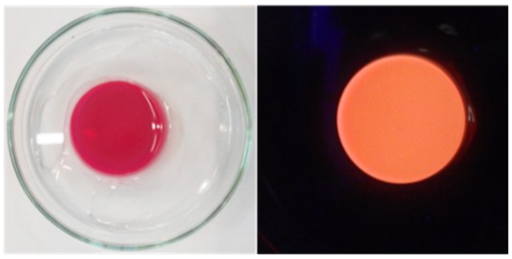


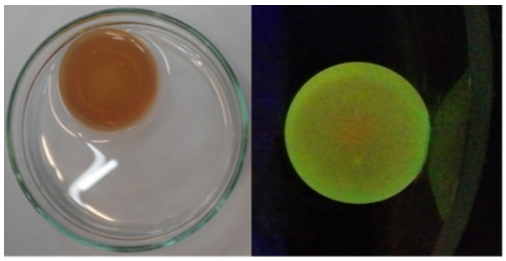
Figure S1. (A) FT-IR spectra of (a) GOx, (b) **P1**, (c) **P2**, and (d) **P1**@GOx. (B) XPS spectra of (a) **P1** and (b) **P2**. Red and green curves indicate the fitted and deconvoluted ones, respectively.



(a)

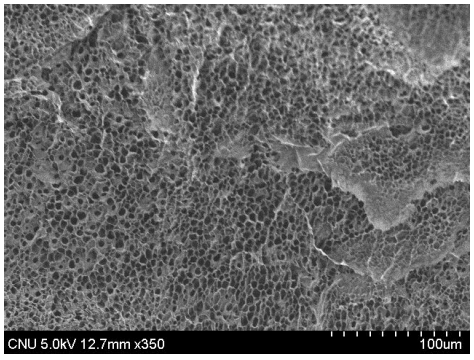


(b)

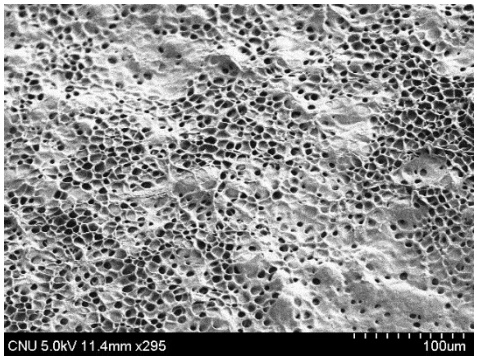


(c)

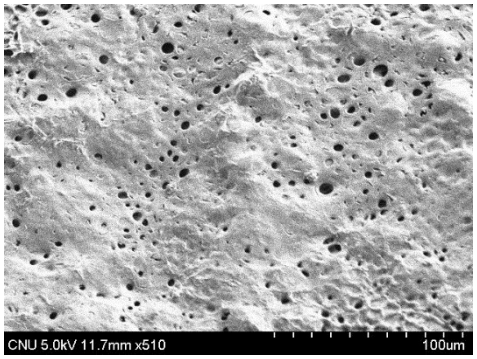
Figure S2. Fluorescence spectra (a) and photographs of **P1**-based hydrogel at pH 4 (b) and at pH 10 (c). The photographs were taken under ambient light (left) and UV irradiation (365 nm, right).



(a)

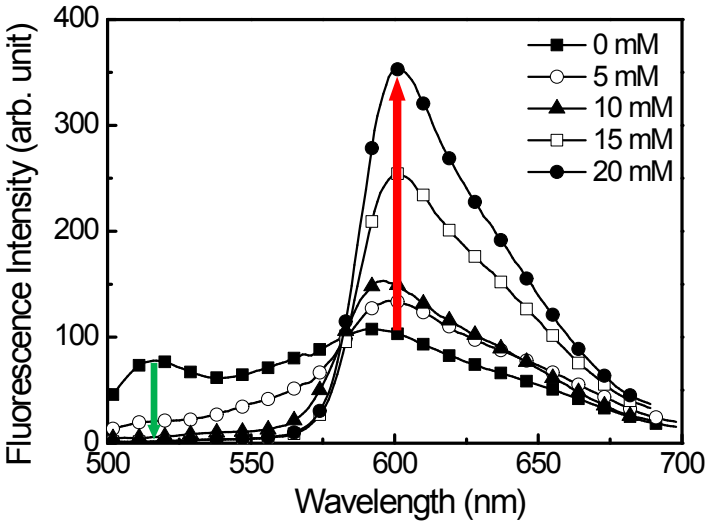


(b)

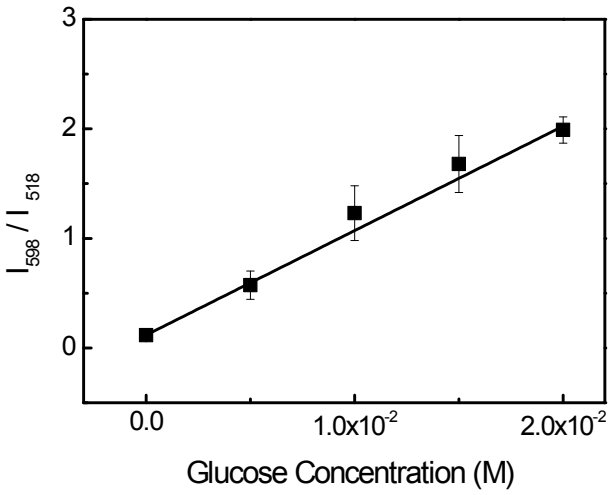


(c)

Figure S3. SEM images of the pristine **P1**-based hydrogel (a), **P1**-GOx hydrogel (b), and **P1**@GOx hydrogel (c).



(a)



(b)

Figure S4. (a) Changes in the fluorescence spectra of **P1**-GOx hydrogel (0.57 g) as a function of glucose concentrations and (b) plot of relative fluorescence intensity versus concentration of glucose. I_{598} and I_{518} correspond to the emission intensity at 598 nm and 518 nm, respectively. Excitation wavelength, λ_{ex} = 490 nm.

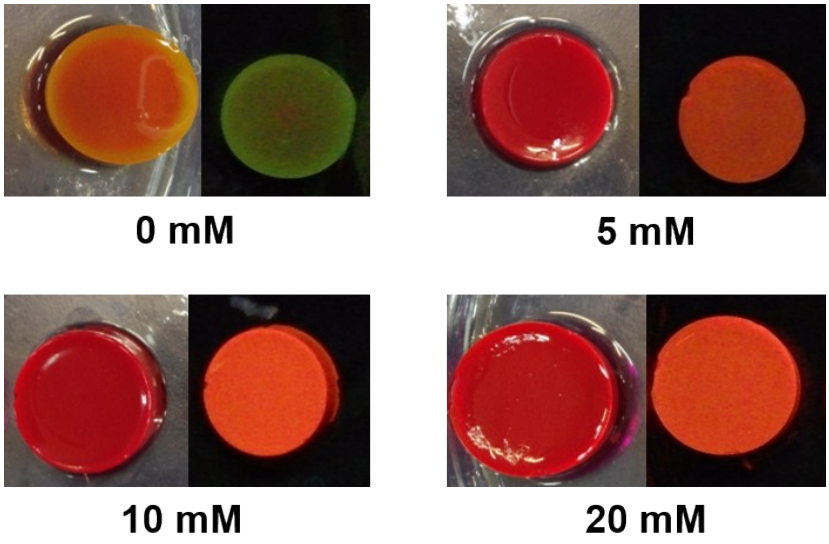


Figure S5. Photographs of the **P1**-GOx hydrogel according to the concentrations of glucose under ambient (left) and UV light (365 nm, right).

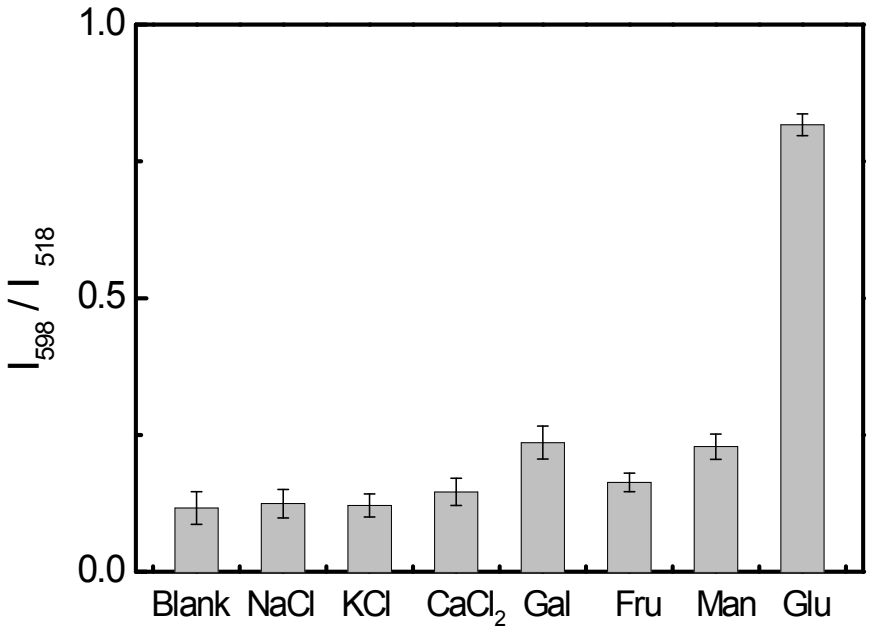


Figure S6. Selectivity of the **P1**-GOx hydrogel upon exposure to sodium chloride, potassium chloride, calcium chloride, galactose (Gal), fructose (Fru), mannose (Man) and glucose (Glu). [Monosaccharides] = 10 mM and [Electrolytes] = 10 mM. I_{598} and I_{518} correspond to the emission intensity of the **P1**-GOx hydrogel at 598 nm and 518 nm, respectively.

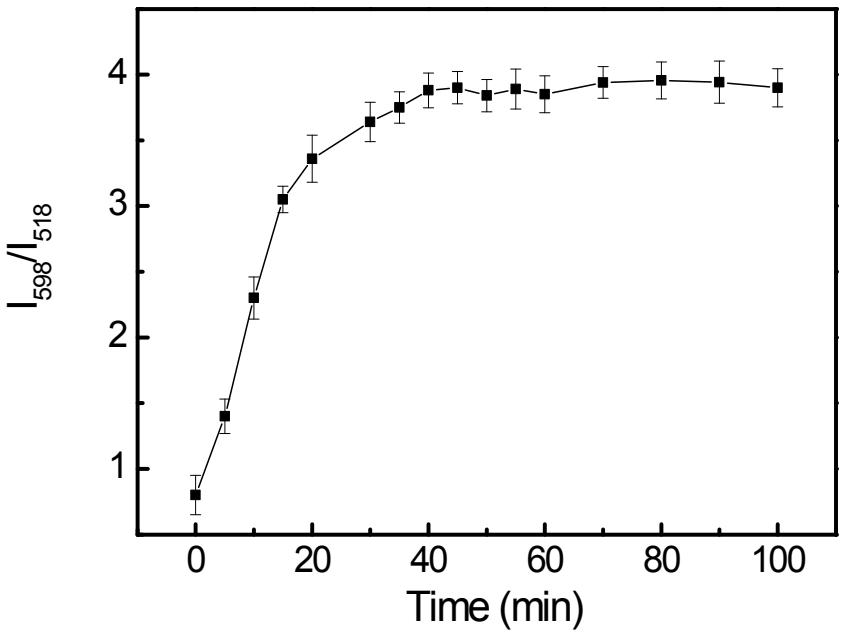


Figure S7. Change in relative intensity (I_{598}/I_{518}) of P1@GOx upon exposure time to glucose. [Glucose] = 0.01 M. I_{598} and I_{518} correspond to the emission intensity at 598 nm and 518 nm, respectively. Excitation wavelength, λ_{ex} = 490 nm.

a

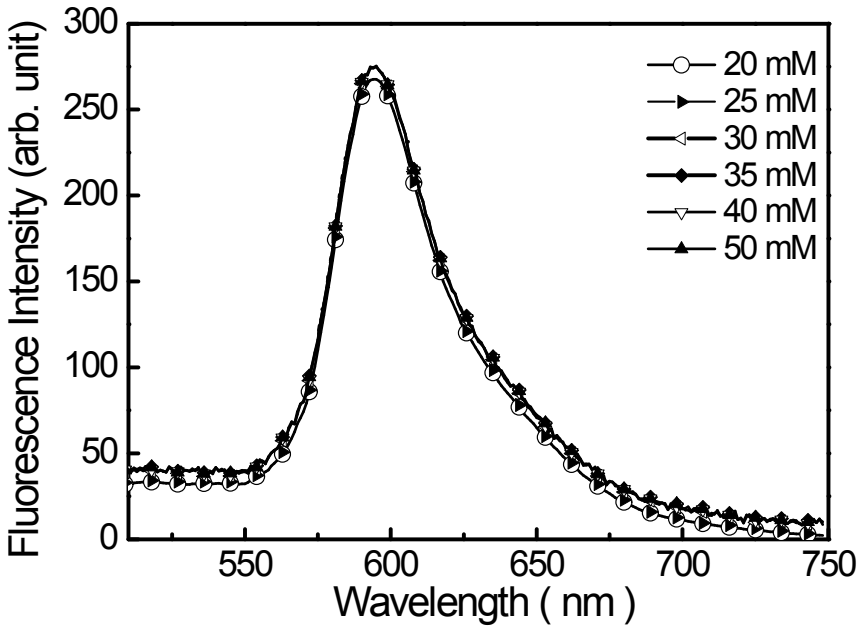


Figure S8. Changes in the fluorescence spectra of **P1**@GOx hydrogel (0.57 g) as a function of glucose concentrations (20 to 50 mM). Excitation wavelength, λ_{ex} = 490 nm.