Electronic Supplementary Material (ESI) for Soft Matter.

Supporting Information for

A CO_2-responsive hydrogel film for optical sensing of dissolved CO_2

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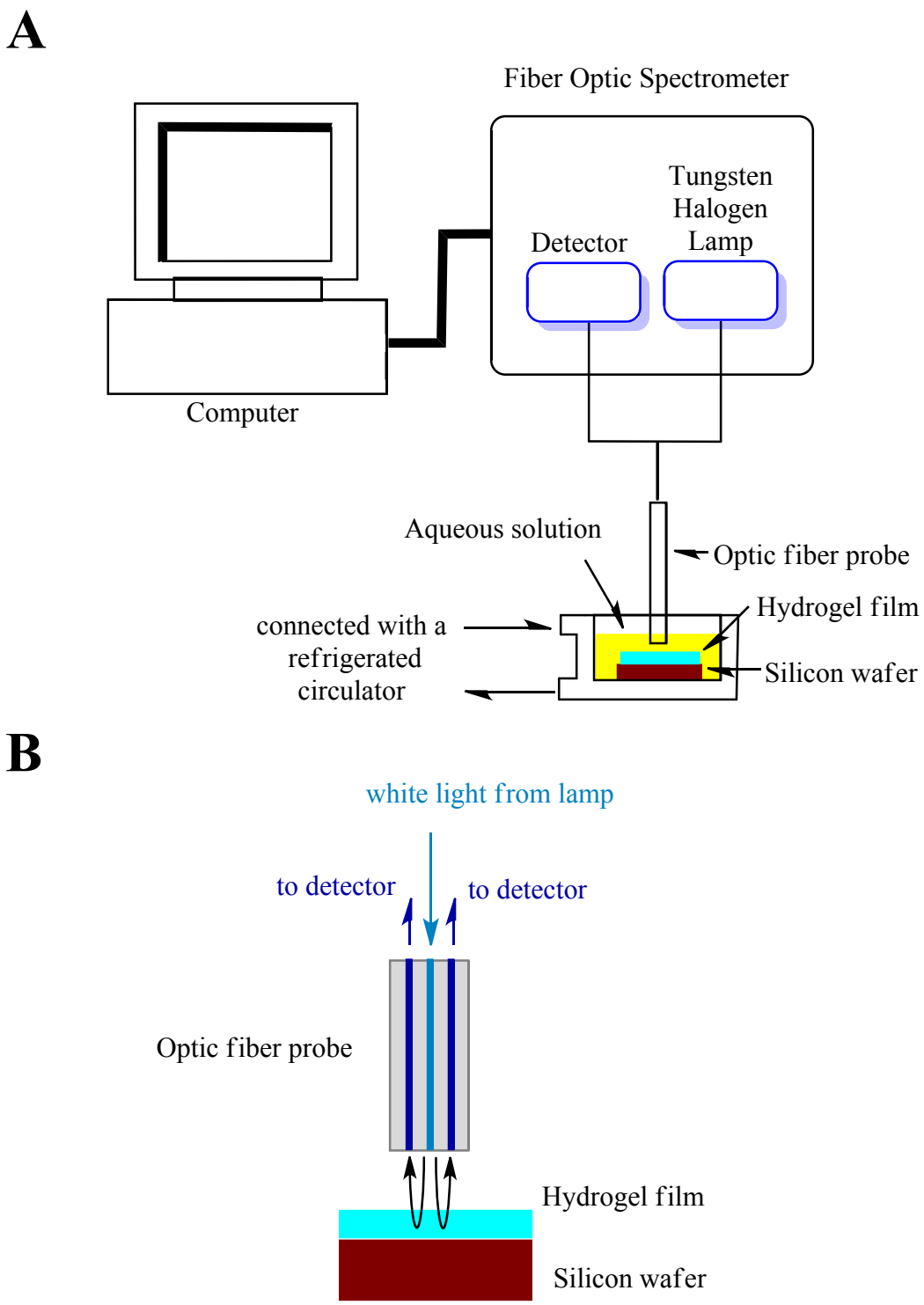

Fig. S1. (A) Experimental setup for film swelling study. (B) Schematic diagram for measurement of the reflection spectra of the hydrogel film using a fiber optic spectrometer. White light from the lamp in the spectrometer is reflected by the thin hydrogel film. The reflected light is collected and directed to and analyzed by the detector. Because of the interferences between beams reflected at the two interfaces of the film, Fabry-Perot fringes appear on the reflection spectra.

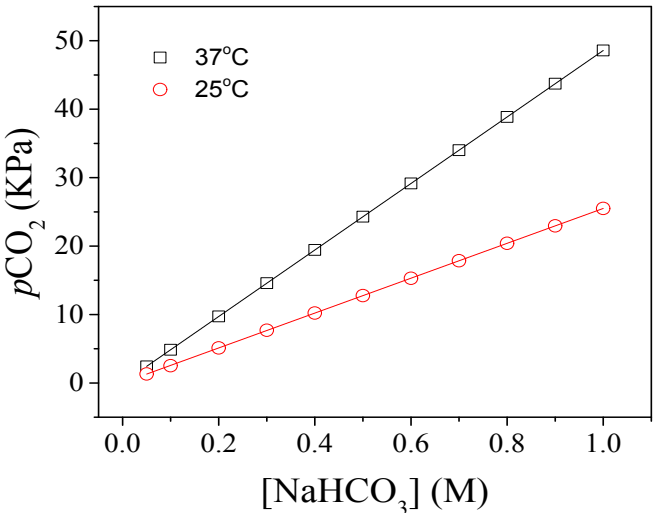

Fig. S2. The relationship between pCO_2 and the concentration of $NaHCO_3$ solution at 25 and 37°C.

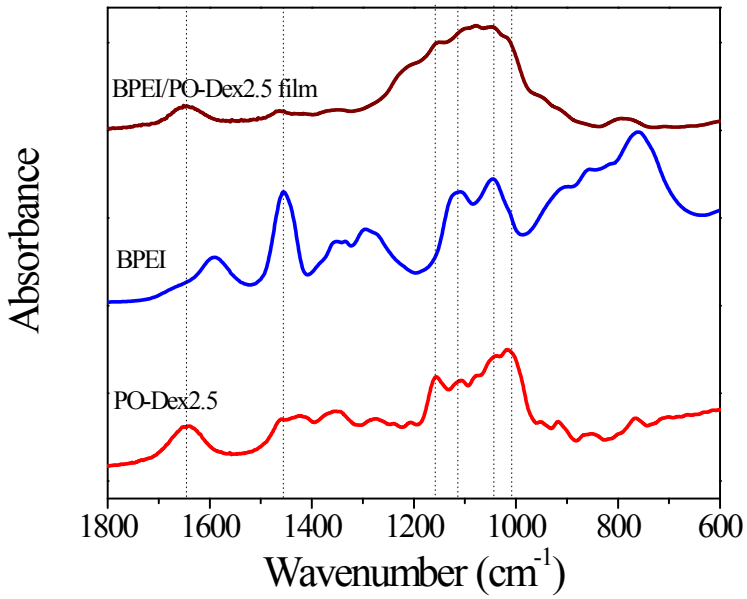

Fig. S3. FTIR spectra of a BPEI/PO-Dex2.5 film and the component polymers, BPEI and PO-Dex2.5.

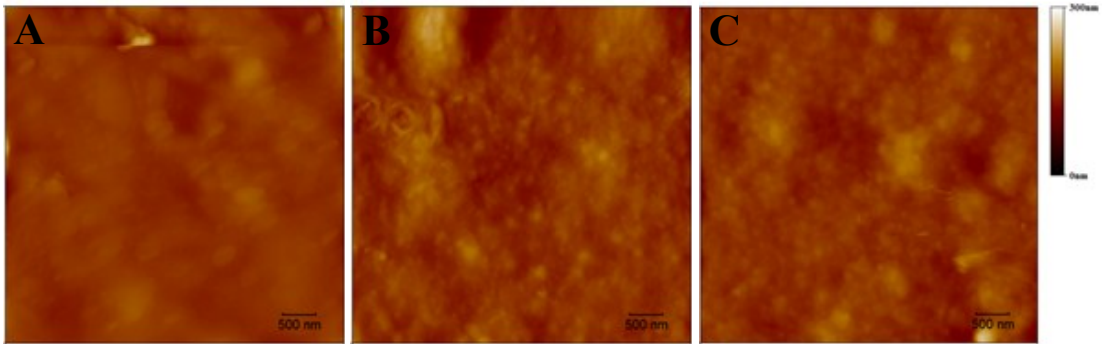

Fig. S4. AFM images (5 µm×5 µm) of 3 BPEI/PO-Dex films. A: $(BPEI/PO\text{-}Dex2.5)_{200}$ film, B: $(BPEI/PO\text{-}Dex5)_{200}$ film, C: $(BPEI/PO\text{-}Dex7.5)_{200}$ film.

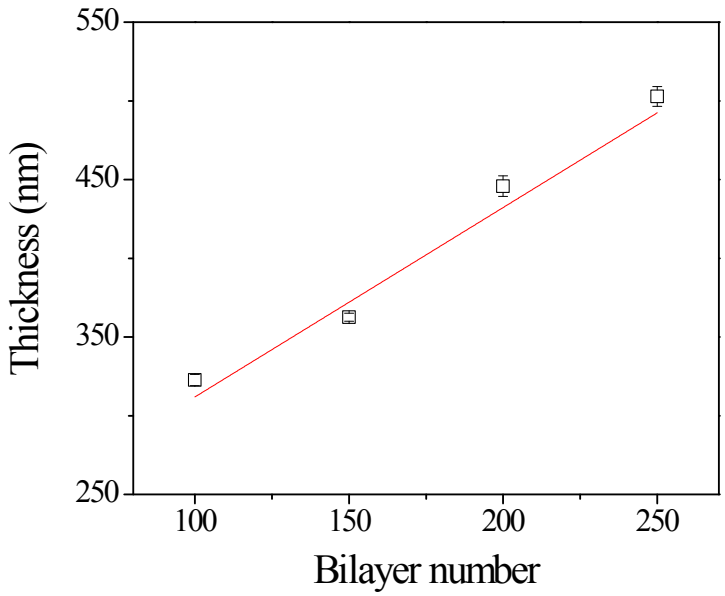

Fig. S5. Film thickness of BPEI/PO-Dex2.5 film with various bilayer numbers. The film thicknesses were determined by stylus profiler.

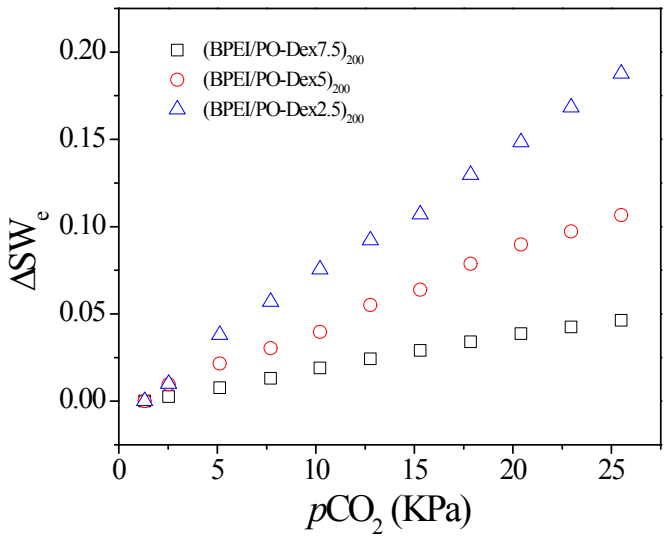

Fig. S6. Changes in SD_e of 3 BPEI/PO-Dex films to dissolved CO_2 as a function of pCO_2 value (calculated from the concentration of $NaHCO_3$ solution). T=25°C.