Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Electronic Supplementary Information

Control of Hydration Layer States on Phosphorus-containing Mesoporous Silica Films and Their Reactivity Evaluation with Biological Fluid

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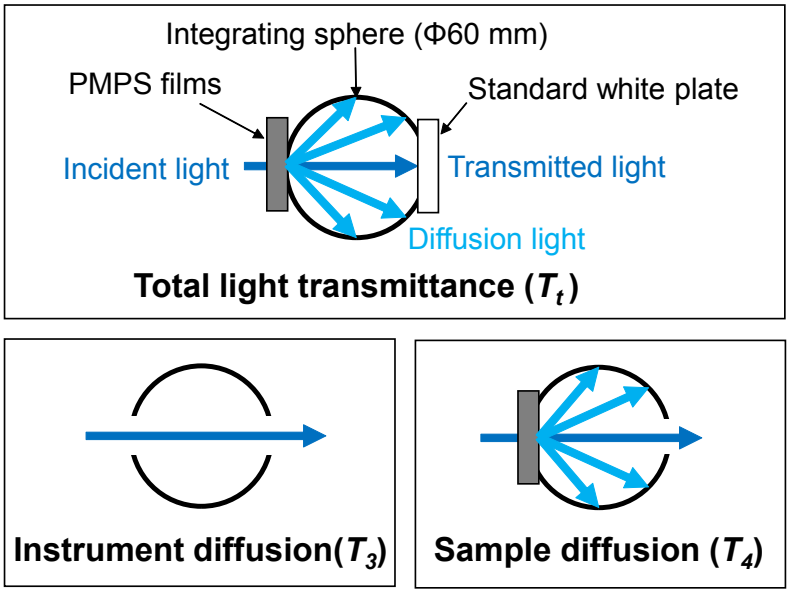
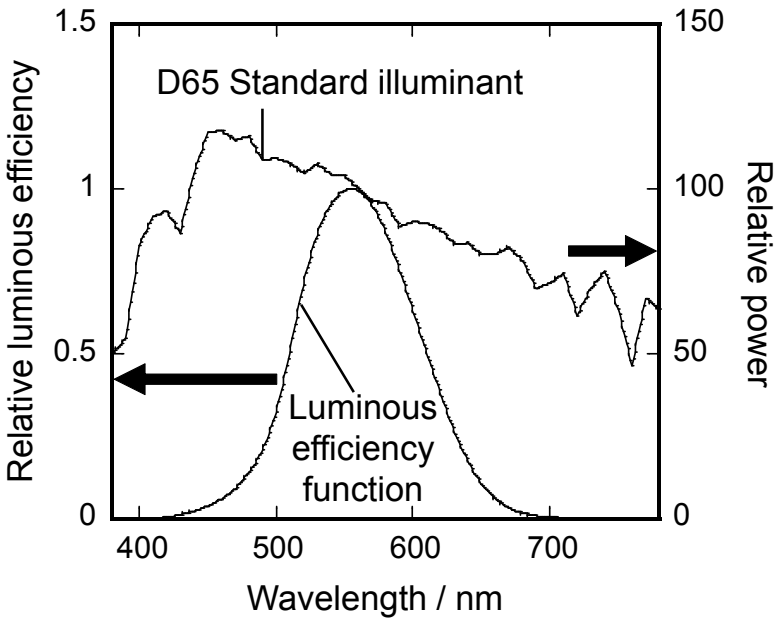
Scheme S1



Scheme S1. Illustration of the haze value measurement setup using the total transmittance (T_t), the instrument diffusion (T_3) and the sample diffusion rate (T_4) inside the integrating sphere.

Scheme S2



Scheme S2. Spectra of luminous efficiency functions and D65 standard illuminant.

Figure S1

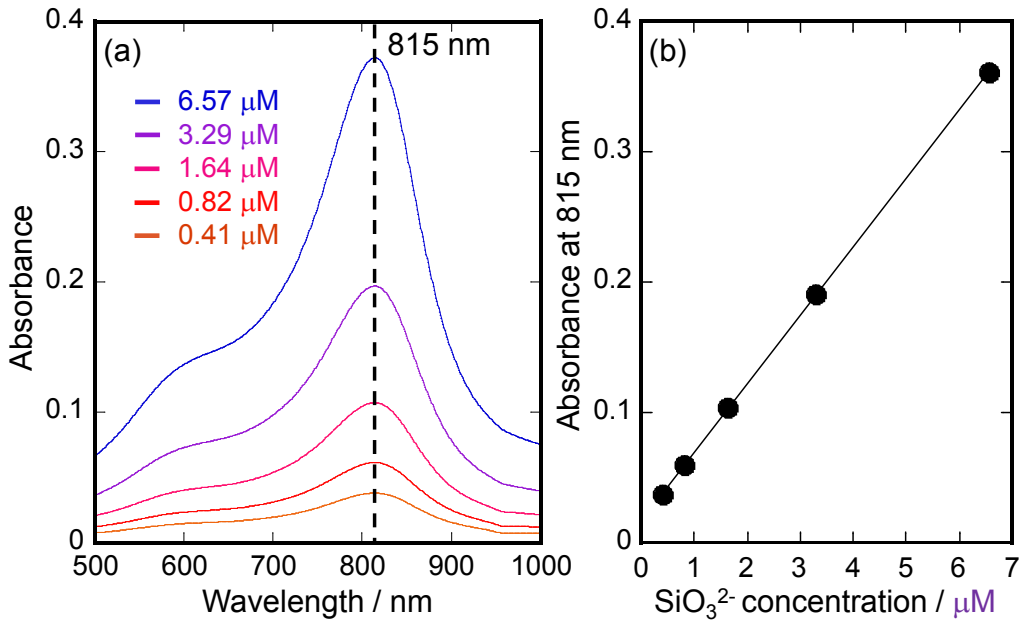


Figure S1. (a) UV-Vis absorption spectra of the molybdenum-blue-staining for SiO_3^{2-} in PB with the different concentrations, and (b) their calibration curve between the concentration and absorbance (R=0.9999).

Figure S2

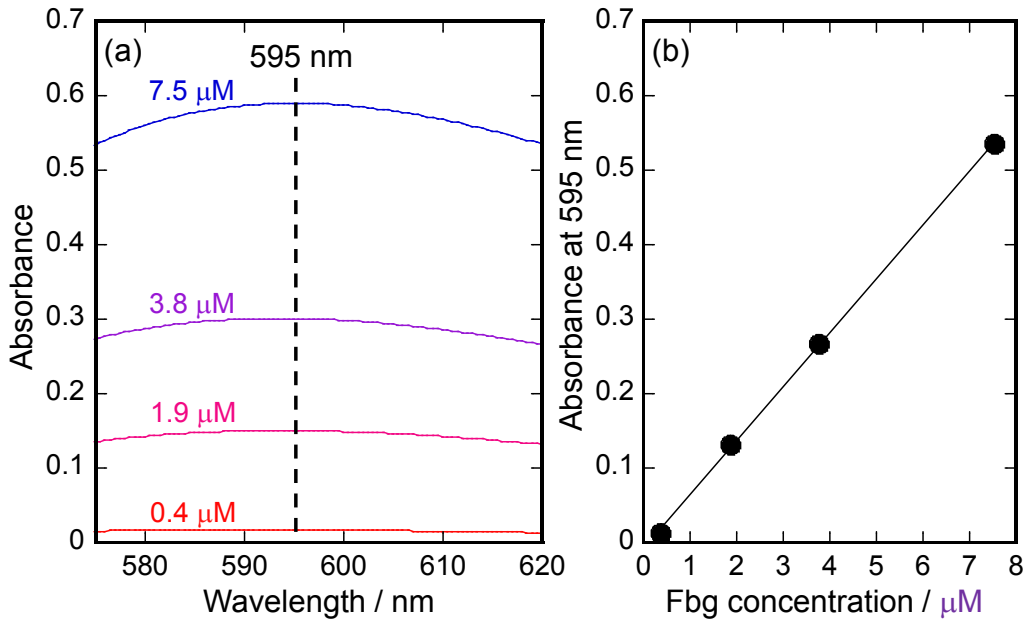


Figure S2. (a) UV-Vis absorption spectra of the Fbg in PB with the different concentrations, and (b) their calibration curve between the concentration and absorbance (*R*=0.9998).

Figure S3

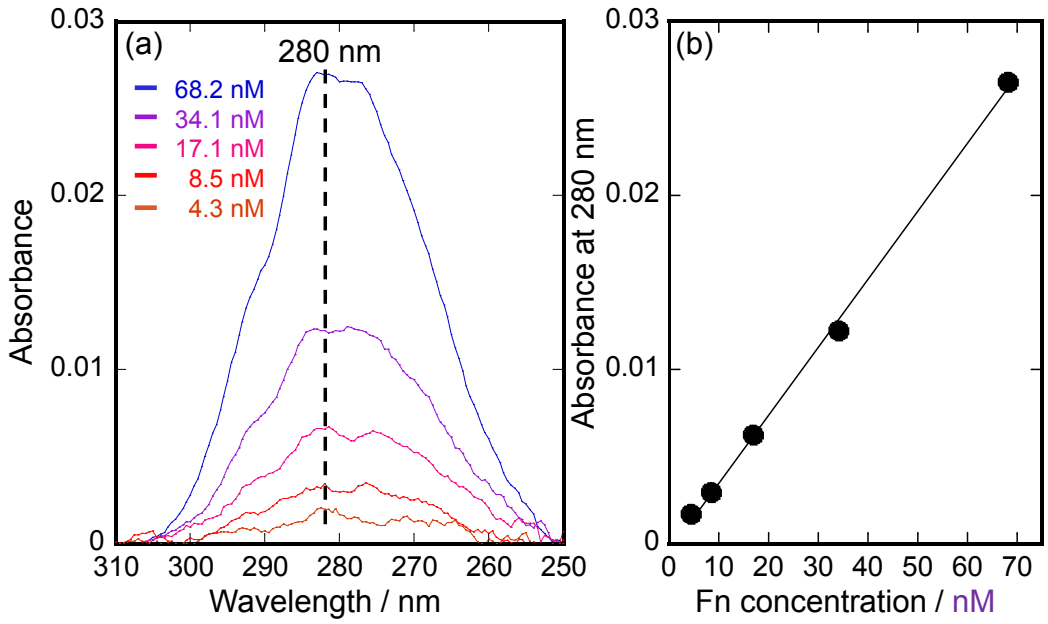
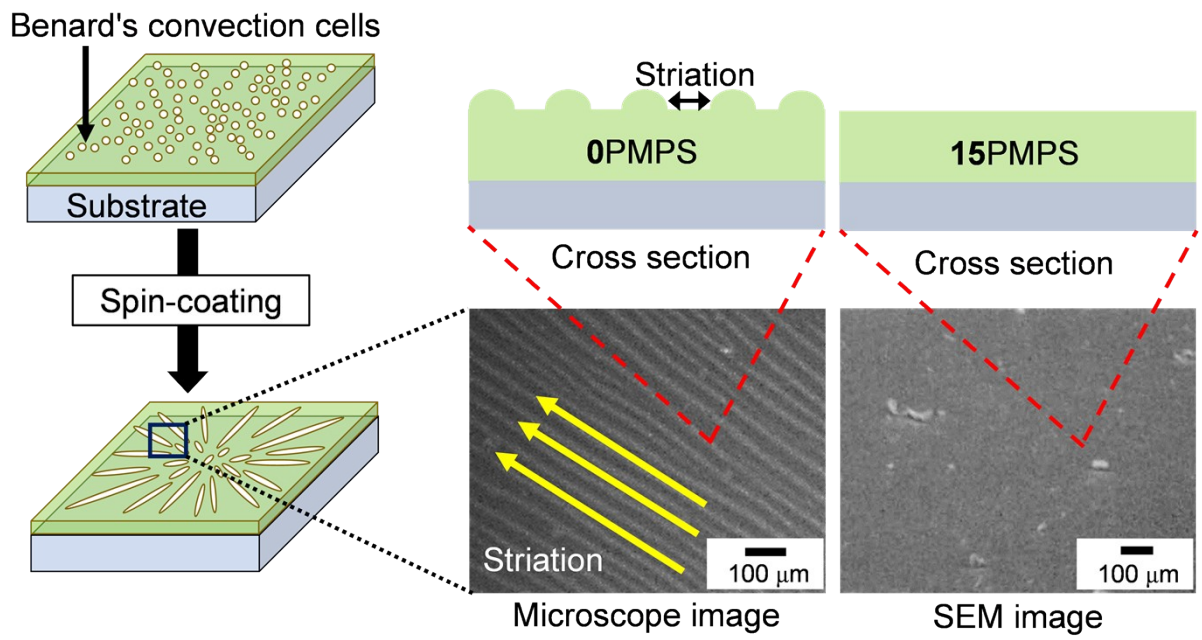


Figure S3. (a) UV-Vis absorption spectra of the Fn in PB with the different concentrations, and (b) their calibration curve between the concentration and absorbance (R=0.9991).

Scheme S3



Scheme S3. Illustration of the possible striped pattern (i.e., striation structure) formation process of **0**PMPS surface by Marangoni effect in the spin-coating and the surface structure observed by the optical microscope, and the **15**PMPS surface structure observed by SEM.

Figure S4

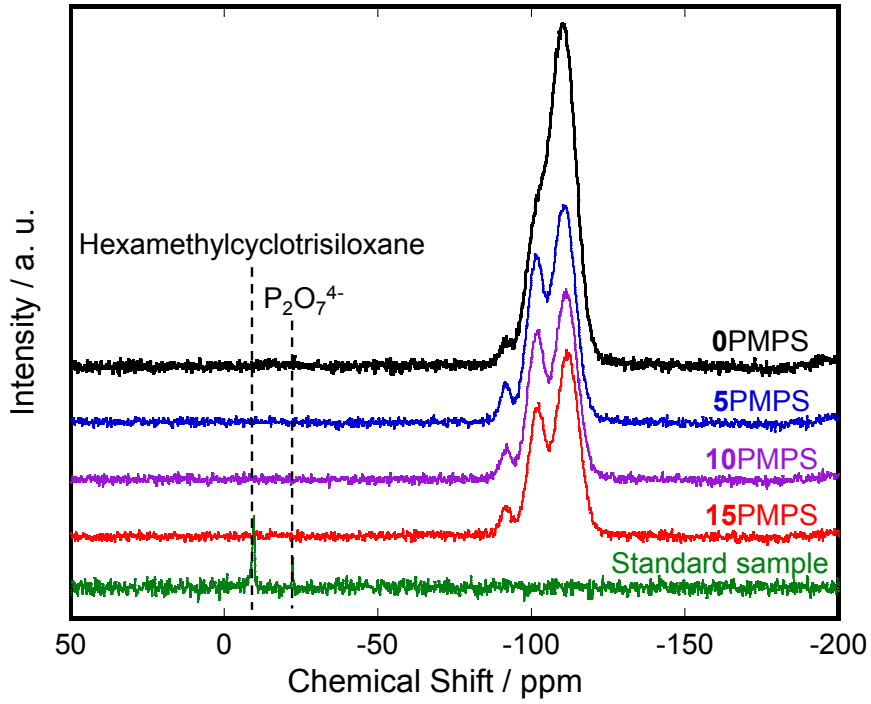


Figure S4. Solid-state ^{29}Si–NMR DD/MAS spectra of the PMPS films. (standard sample: hexamethylcyclotrisiloxane).

Figure S5

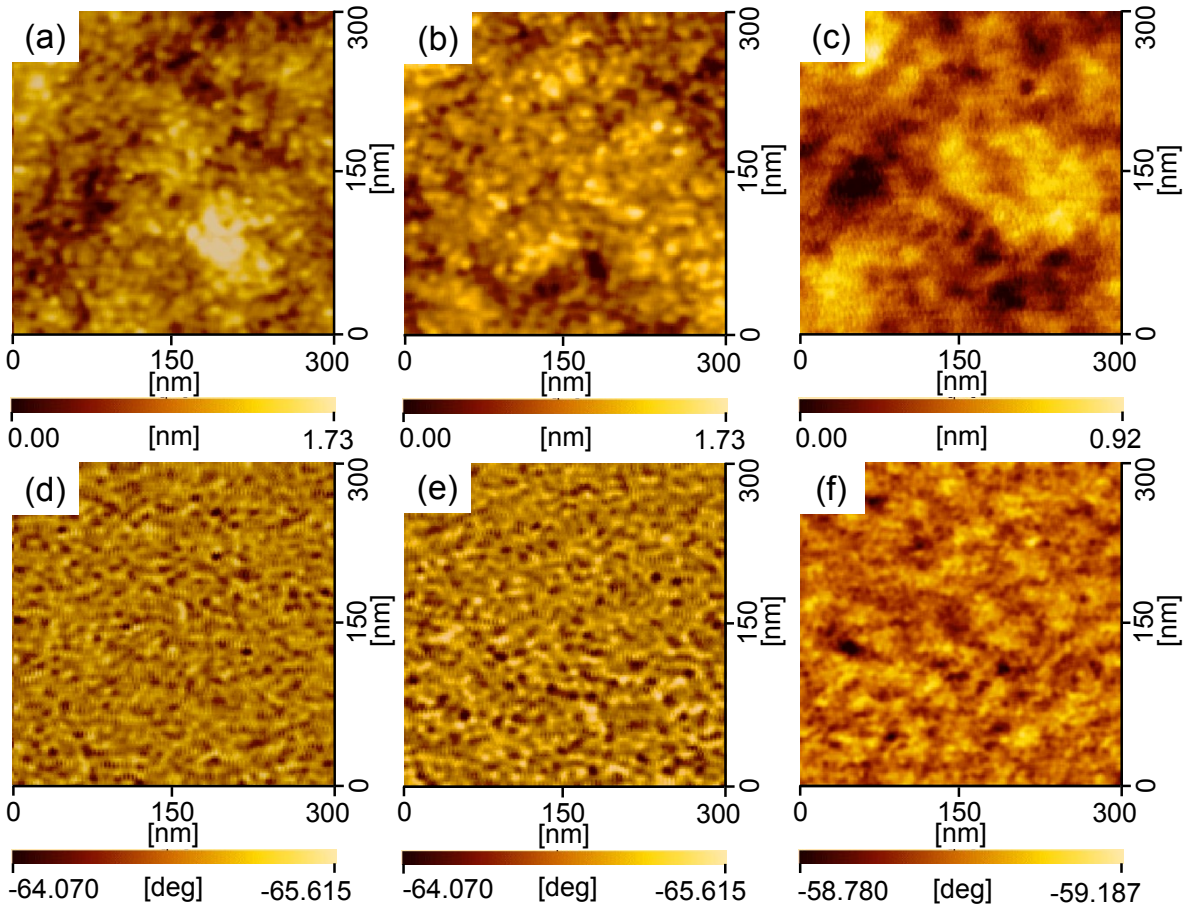


Figure S5. AFM (a–c) topographic and (d–f) phase-shift images of the (a, d) **0**PMPS, (b, e) **15**PMPS and (c, f) Si wafer.

Figure S6

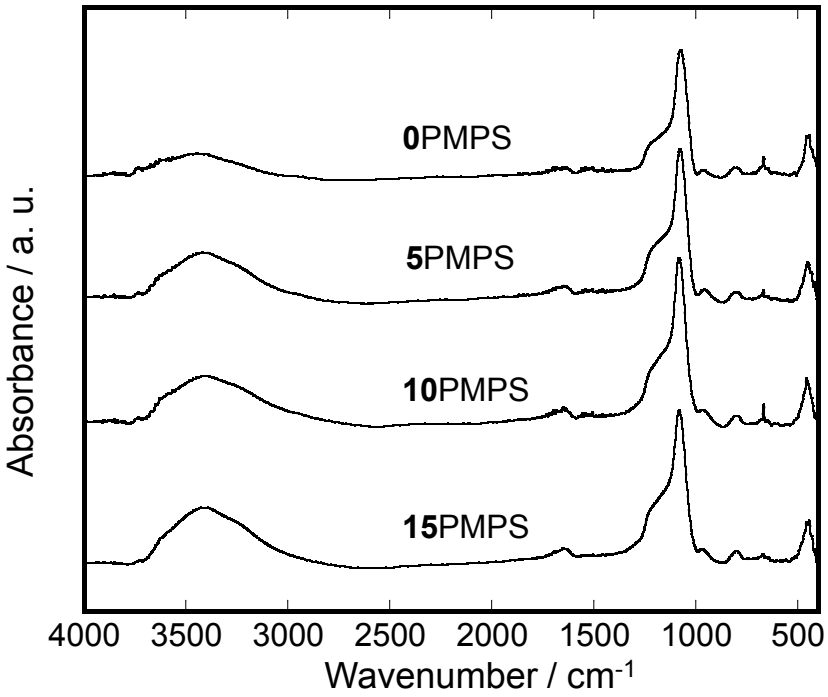


Figure S6. FT-IR spectra of the PMPS films.

Table S1

Table S1. Absorption band assignments of the FT-IR spectra of the PMPS films.

Wavenumber / cm^{-1}	Attribution	Bonding state
450	Si–O–Si P–O–P	Rocking Rocking
801	Si–O–Si	Bending
950	Si–OH P–O–P	Symmetric stretching Asymmetric stretching
1080	Si–O–Si	Symmetric stretching
1140	Si–O–P	Stretching
1200	Si–O–Si P–O–P	Asymmetric stretching Symmetric stretching
1463	P=O	Stretching
1652	H–O–H	Bending
2800	–OH in O=P–OH	Stretching
3420	–OH in Water	Stretching
3650	Si–OH	Stretching

Figure S7

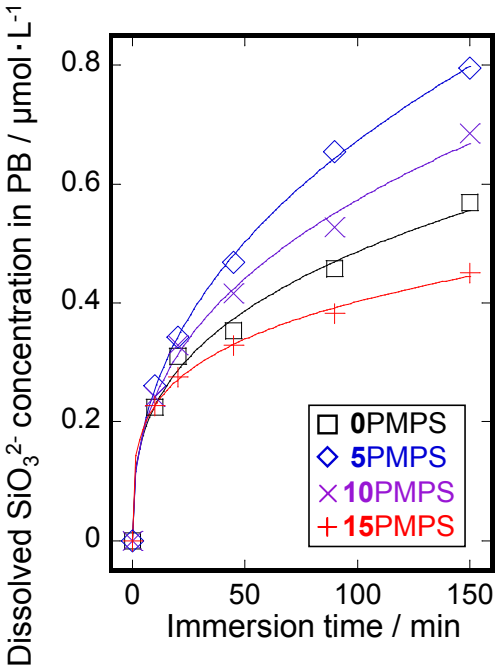


Figure S7. Dissolved SiO_3^{2-} concentration from the PMPS films into PB with the immersion time.

Figure S8

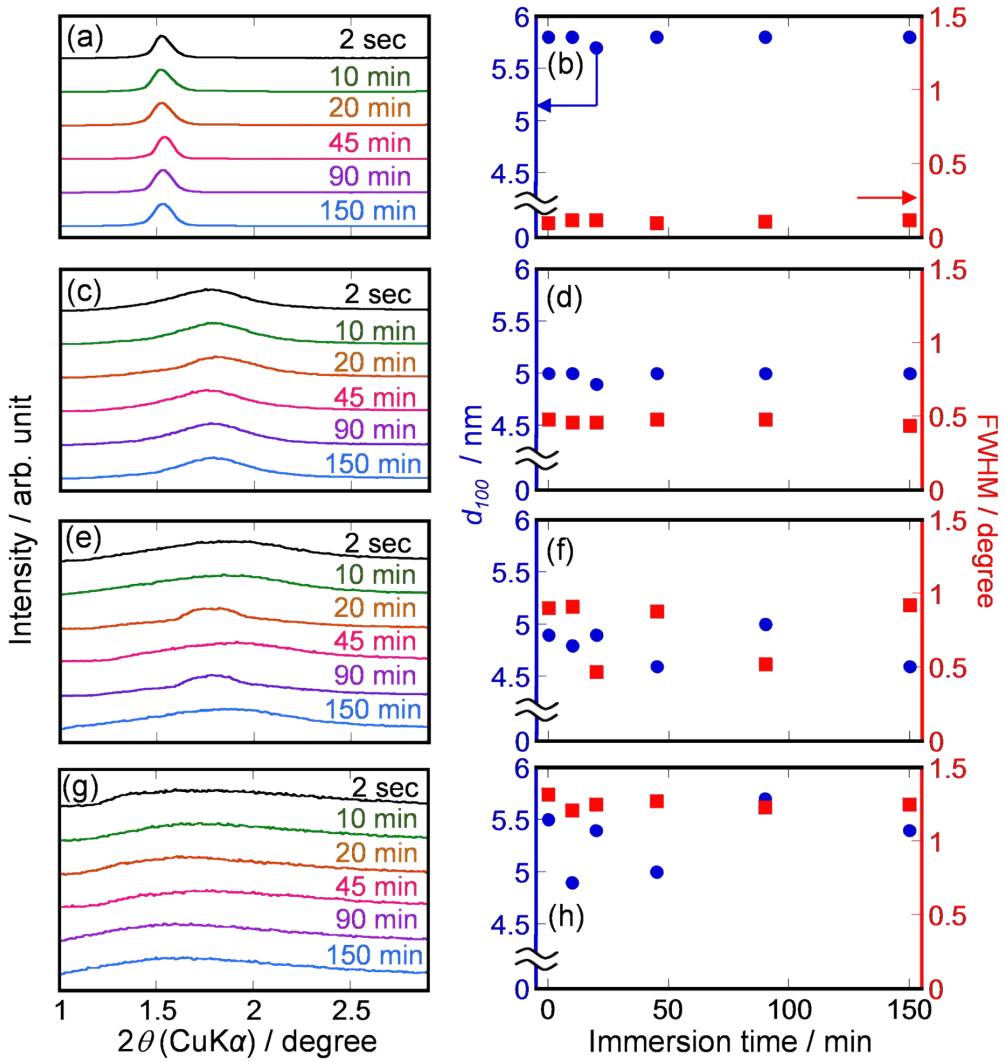


Figure S8. (a, c, e, g) XRD patterns and (b, d, f, h) d_{100} (nm) and FWHM (degree) of (a,b) **0**PMPS, (c,d) **5**PMPS, (e,f) **10**PMPS and (g,h) **15**PMPS at the different immersion times.

Figure S9

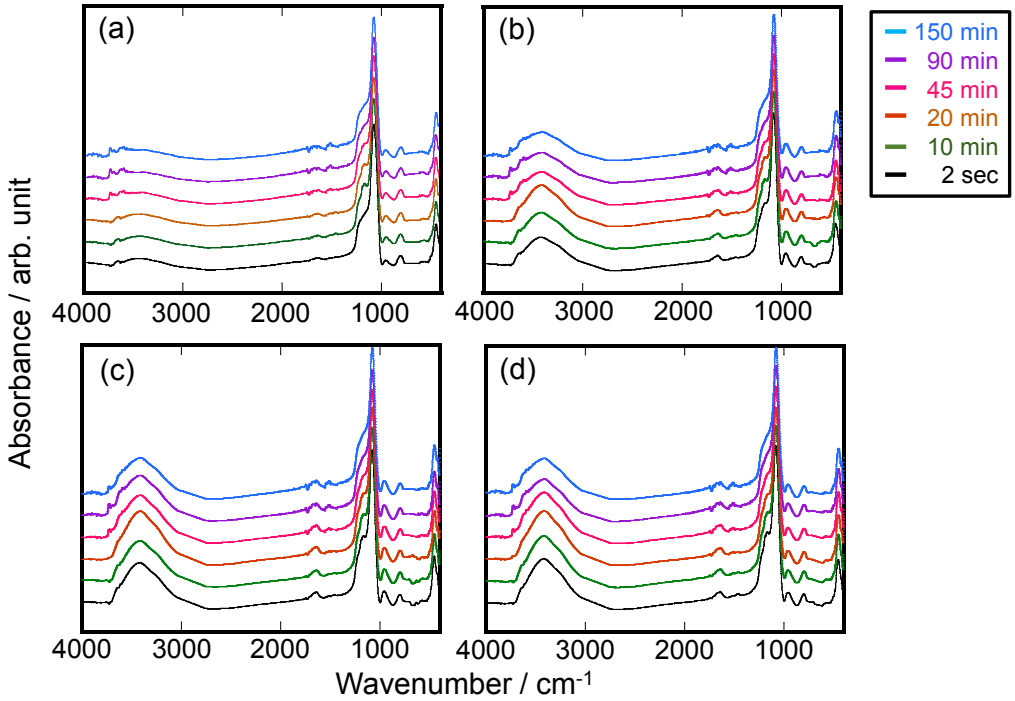


Figure S9. FT-IR spectra of (a) **0**PMPS, (b) **5**PMPS, (c) **10**PMPS and (d) **15**PMPS at the different immersion times.