

Supporting Online Material for

Broad Wavelength Range Chemically Tunable Block Copolymer Photonic Gels

Youngjong Kang,^{1,2} Joseph J. Walsh,¹ Taras Gorishnyy¹
and Edwin L. Thomas^{1*}

¹*Department of Materials Science and Engineering,
Massachusetts Institute of Technology
77 Massachusetts Avenue, Cambridge, MA 022139, USA*

²*Department of Chemistry, Hanyang University
17 Haengdang-dong, Seungdong-gu, Seoul, 133-791, Korea*

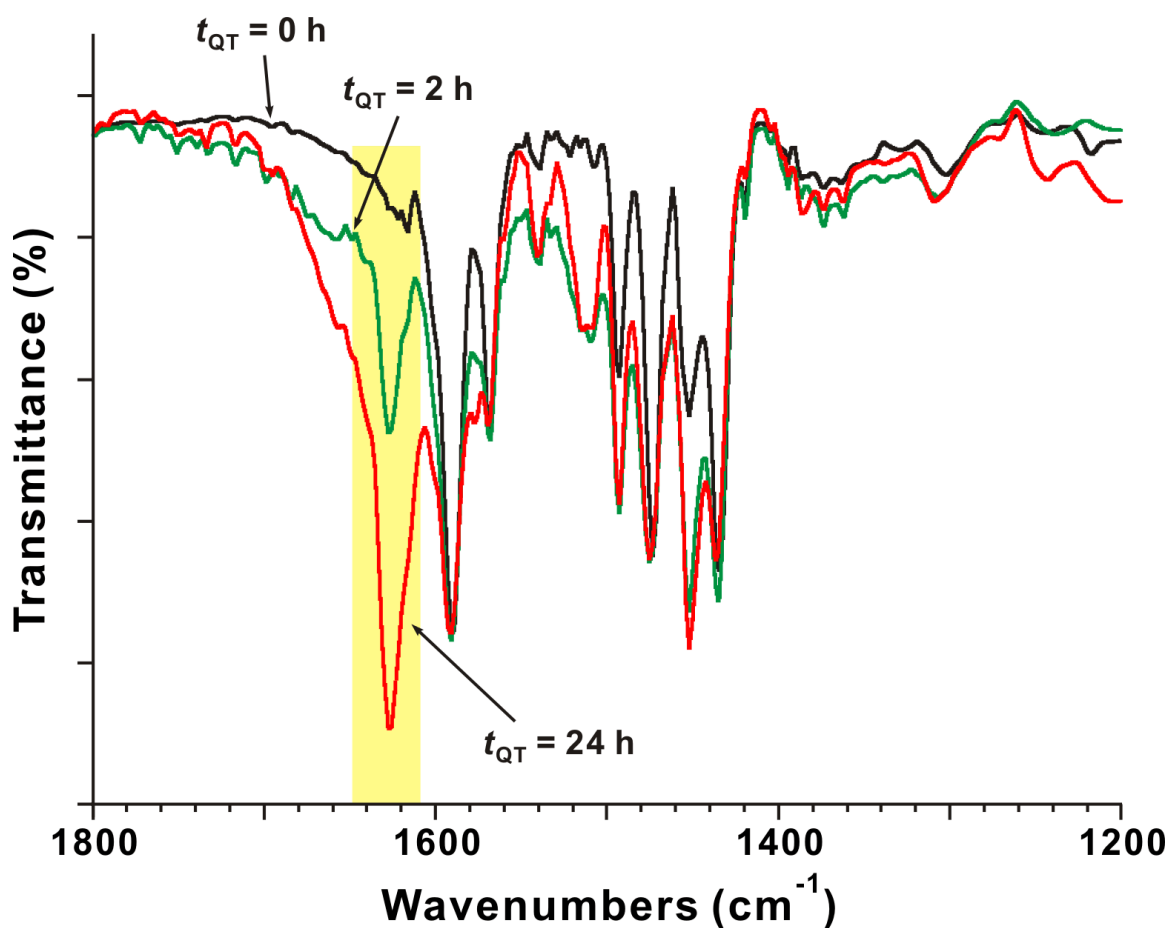


Figure S1. FT-IR spectra of a PS-*b*-QP2VP film obtained after various quaternization times (t_{QT}). The characteristic pyridinium band at 1627 cm^{-1} increased with increase of the reaction time.¹ The spectrum obtained at $t_{QT} = 72 \text{ h}$ was almost the same as that obtained at $t_{QT} = 24 \text{ h}$, which suggests that all pyridine groups can be converted to pyridinium groups after 24 h (or less) of reaction.

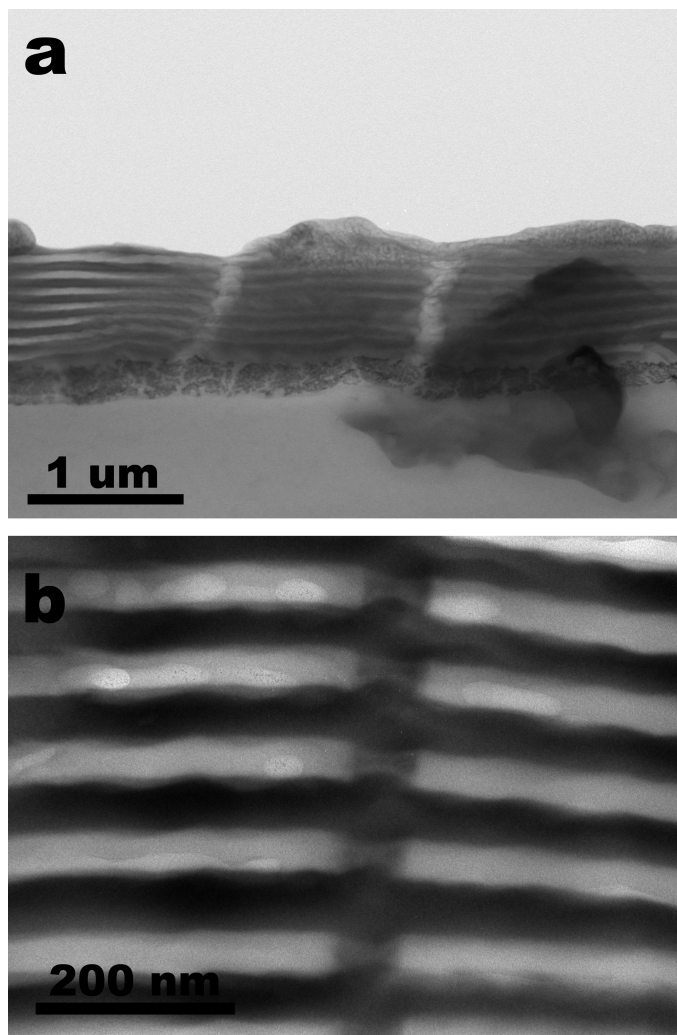


Figure S2. Cross sectional TEM micrographs of a dry PS-*b*-QP2VP ($M_n \times 10^3 = 190/190$) photonic film spun onto an epoxy substrate and stained with I₂ vapor showing the PS (light) and QP2VP (dark) layers. Images indicate two types of defects; a) vertically oriented defect pores and b) helicoidal screw dislocations which contribute to the fast transport for aqueous solvents and ions when the film is immersed in aqueous solution.

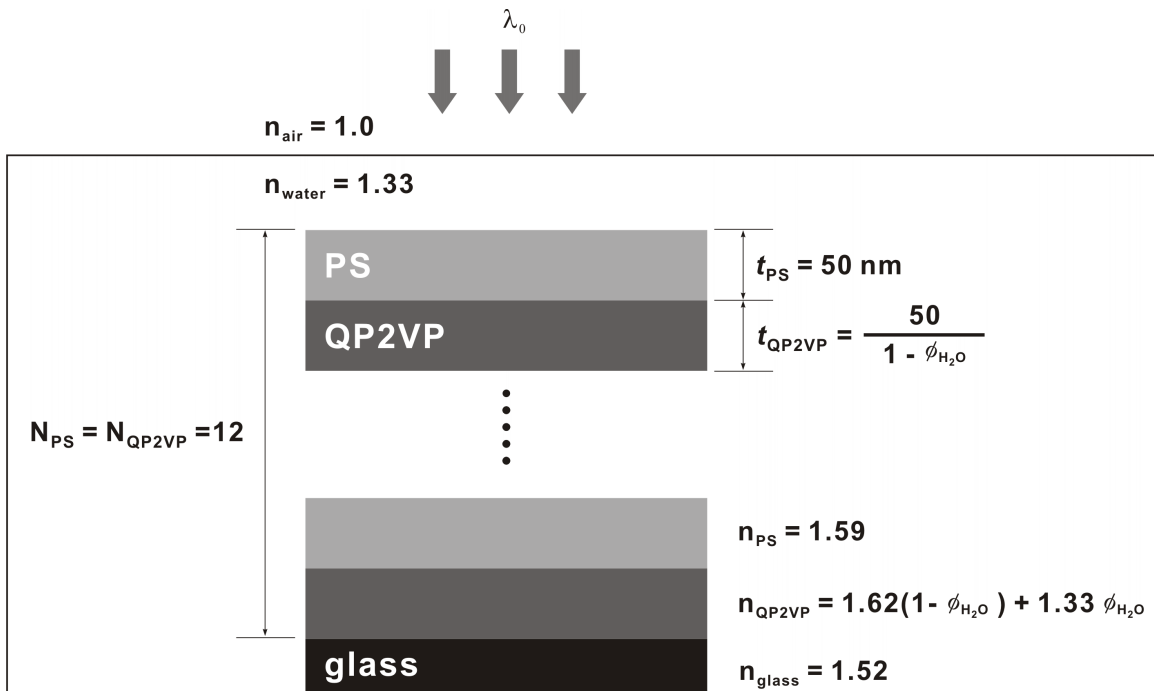


Figure S3. The parameters used for calculating the reflection spectra of photonic gel films by the transfer matrix model (TMM). The refractive index of QP2VP was scaled to a simple rule of mixtures based on water content of the QP2VP layers. The thickness of QP2VP was also scaled as a function of $\phi_{\text{H}_2\text{O}}$ based on the assumption of uniaxial expansion of layers by swelling.

REFERENCES

1. Huang, A., Xiao, C., and Zhuang, L., *J. Appl. Polym. Sci.* **96**, 2146-2153 (2005).