

Electronic supplementary information (ESI)

**Poly(dimethylsiloxane) (PDMS) surface patterning by biocompatible
photo-crosslinking block copolymers†**

Keita Kuroda,^a Hiromi Miyoshi,^b Shota Fujii,^c Tomoyasu Hirai,^c Atsushi Takahara,^{c,d}
Aiko Nakao,^e Yasuhiko Iwasaki,^f Kenichi Morigaki,^g Kazuhiko Ishihara^h and Shin-ichi
Yusa*^a

^a*Department of Materials Science and Chemistry, University of Hyogo, 2167 Shosha,
Himeji, Hyogo 671-2280, Japan. E-mail: yusa@eng.u-hyogo.ac.jp; Fax: +81-79-267-
4954; Tel: +81-79-266-8868*

^b*RIKEN Center for Advanced Photonics, RIKEN, 2-1 Hirosawa, Wako, Saitama 351-
0198, Japan*

^c*Graduate School of Engineering, Kyushu University, 744 Motooka, Nishi-ku, Fukuoka
819-0395, Japan*

^d*Institute for Materials Chemistry and Engineering, Kyushu University, 744 Motooka,
Nishi-ku, Fukuoka 819-0395, Japan*

^e*Nishina Center for Accelerator-Based Science Nuclear Spectroscopy Laboratory,
RIKEN, 2-1 Hirosawa, Wako, Saitama 351-0198, Japan*

^f*Faculty of Chemistry, Materials and Bioengineering, University of Kansai, 3-3-35*

Yamate, Suita, Osaka 564-8660, Japan

^g*Research Center for Environmental Genomics, University of Kobe, 1-1*

Rokkodai, Nada, Kobe 657-8501, Japan

^h*School of Engineering, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8656, Japan*

Synthesis of PMPC₁₂₀.

MPC (10.0 g, 33.9 mmol), CPD (79.2 mg, 0.28 mmol), and V-501 (39.6 mg, 0.14 mmol) were dissolved in a mixture of methanol and water (33.9 mL, 9/1 = v/v). The solution was deoxygenated with Ar gas for 30 min. The solution was stirred at 70 °C for 4 h. After polymerization, the solution was dialyzed against pure water for 3 days. The resulting polymer (PMPC₁₂₀) was recovered using freeze-drying (10.0 g, 99.0%). Number-average molecular weight (M_n (NMR)) and degree of polymerization (DP) were 3.57 × 10⁴ and 120, respectively, estimated from ¹H NMR. Molecular weight distribution (M_w/M_n) was 1.16, estimated from gel-permeation chromatography (GPC).

Table S1 Surface elemental compositions from XPS and calculation

	Bare PDMS XPS (%)	Bare PDMS Calculated (%)	Polymer-coated PDMS XPS (%)	Polymer-coated PDMS Calculated (%)
C	50.24	50.00	59.30	65.47
N	-	-	1.16	3.37
O	25.09	25.00	24.25	23.11
P	-	-	1.75	3.37
Si	24.66	25.00	13.55	4.38

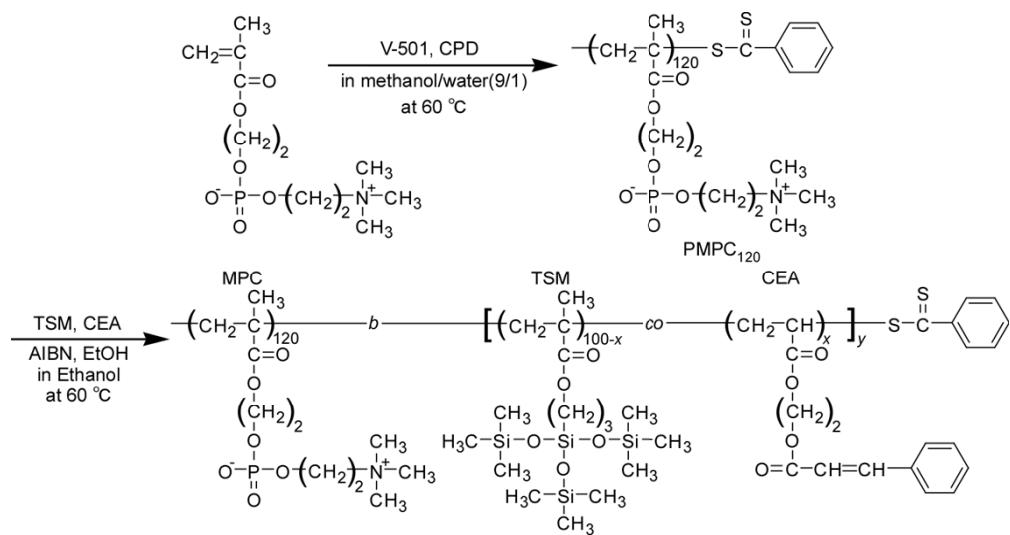


Fig. S1 Synthetic route of $\text{PMPC}_{120}\text{-P}(\text{TSM/CEAx})_y$.

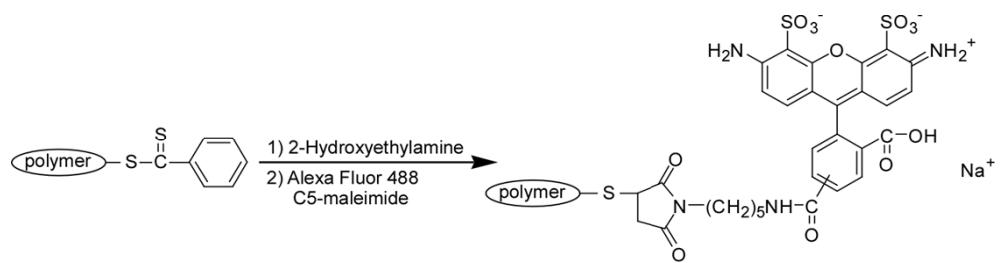


Fig. S2 Fluorescence labelling of the end group of the polymers.

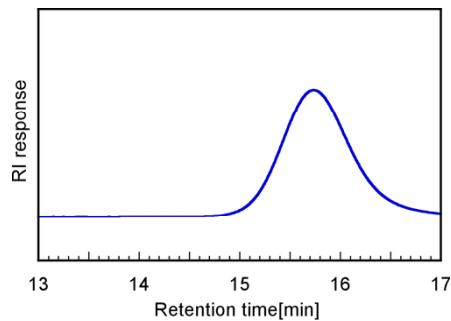


Fig. S3 GPC elution curve for PMPC₁₂₀ using a mixed solution of phosphate buffer (pH 9) and acetonitrile (9/1, v/v) as an eluent.

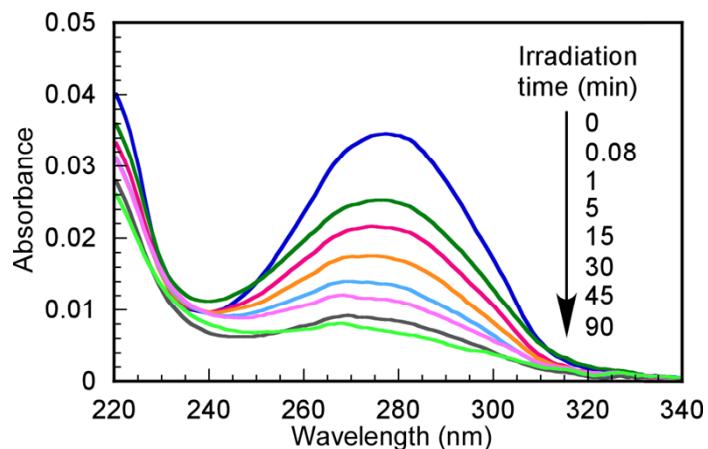


Fig. S4 Changes in UV-Vis adsorption spectra of $\text{PMPC}_{120}\text{-P(TSM/CEA10)}_{58}$ film prepared on a quartz glass substrate upon UV irradiation (time indicated in the figure).

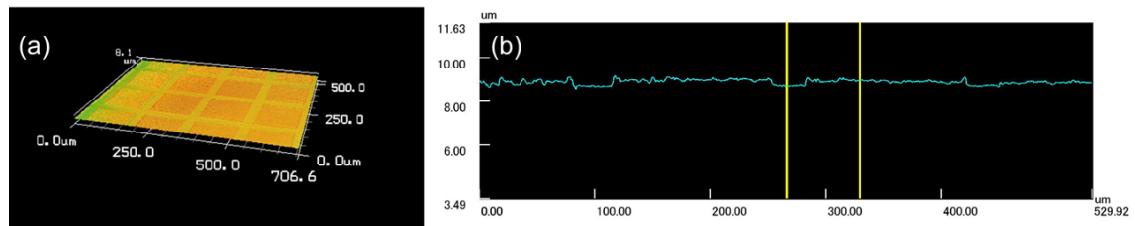


Fig. S5 Laser micrograph of (a) $\text{PMPC}_{120}\text{-P}(\text{TSM/CEA10})_{58}$ coated on a PDMS substrate and (b) film thickness measurement.

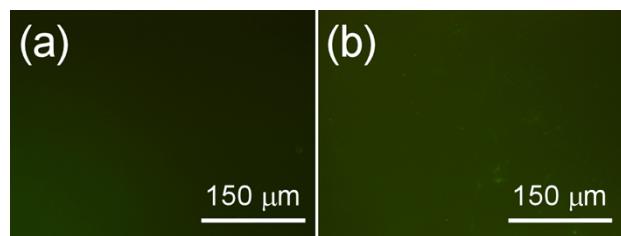


Fig. S6 Fluorescence micrographs of (a) $\text{PMPC}_{120}\text{F}$ and (b) $\text{PMPC}_{120}\text{-TSM}_{68}\text{F}$ coated on a PDMS substrate.

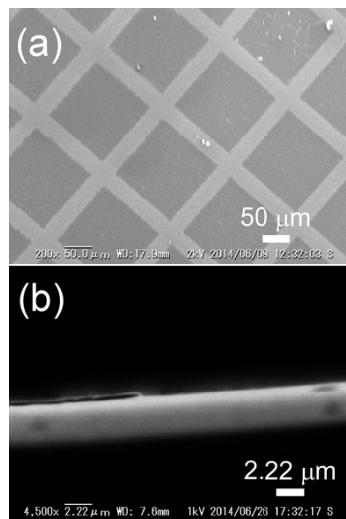


Fig. S7 SEM images of (a) $\text{PMPC}_{120}\text{-P}(\text{TSM/CEA10})_{58}$ lattice pattern on PDMS substrate and (b) its cross section.

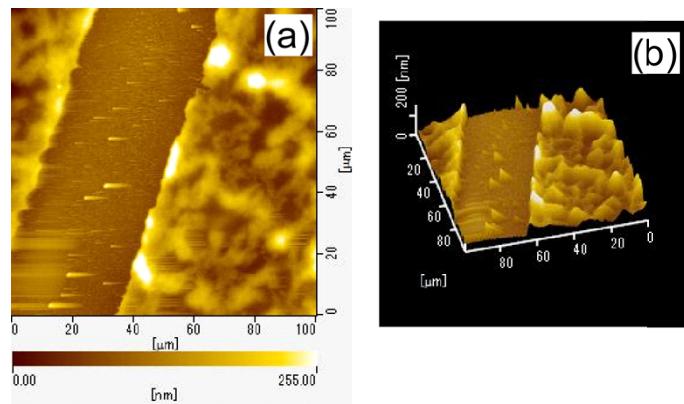


Fig. S8 Representative AFM height (a) and topographical (b) images of PMPC₁₂₀-P(TSM/CEA10)₅₈ coated on a PDMS substrate.

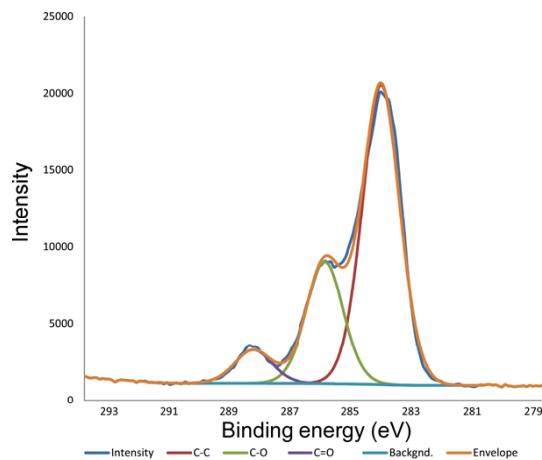


Fig. S9 XPS spectrum of C_{1s} for PMPC₁₂₀-P(TSM/CEA10)₅₈ coated on a PDMS substrate.

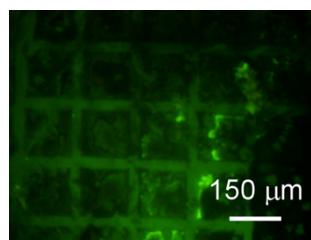


Fig. S10 Fluorescence micrograph of PMPC₁₂₀-P(TSM/CEA9)₂₆ coated on a PDMS substrate after soaking in an aqueous 488-BSA solution.

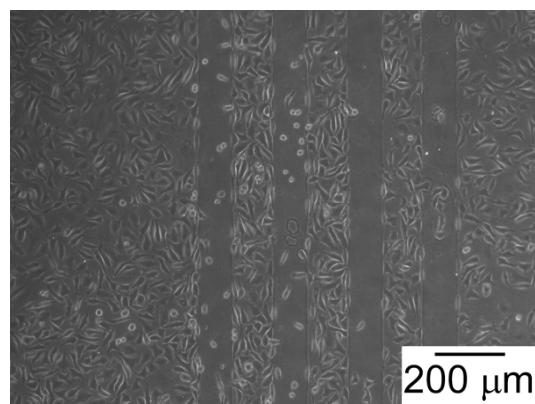


Fig. S11 Typical behavior of L929 cells on a slit PMPC-patterned PDMS substrate.