Electronic Supplementary Information (ESI)

Effect of interfacial structure on bioinert property of poly(2-methoxyethyl acrylate)/poly(methyl methacrylate) blend films in water

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Composition profile in air. Fig. S1 shows the scattering vector (q_z) dependence of neutron reflectivity (NR) for the poly(2-metoxyethyl acrylate (PMEA)/deuterated poly(methyl methacrylate) (dPMMA) blend film with a weight ratio of 50/50 (wt/wt), or a volume ration of 48/52 (v/v) in air. The solid curve in panel (a) was calculated on the basis of the model (b/V) profile shown in panel (b), representing the best fit to the experimental data, shown by open circles. Table S1 summarizes the fitting parameters, where t and σ_i represent the total film thickness and Gaussian roughness, respectively. According to the mean field approximation, the composition profile of a miscible polymer mixture in the surface region is expressed by an exponential decay function.[S1] However, the experimental NR data obtained here could not be well fitted with such a function. Thus, the following (b/V) profile was adopted;

$$(b/V)(z) = \sum_{i=1}^{N} \frac{(b/V)_i - (b/V)_{i+1}}{2} \left\{ 1 + \mathrm{erf}\left(\frac{z - z_i}{\sqrt{2}\sigma_i} \right) \right\} \qquad (1)$$

where N and z are the number of layers and the depth, respectively. Assuming incompressibility of polymer chains, the average (b/V) value for the PMEA/dPMMA blend should be 4.20×10^{-4} nm^{-2}. While the $(b/V)_1$ and $(b/V)_3$ values were much smaller than the average (b/V) value, the $(b/V)_2$ value was slightly larger than that value. This means that the PMEA component with a lower (b/V) value was enriched both at the air and substrate interfaces.

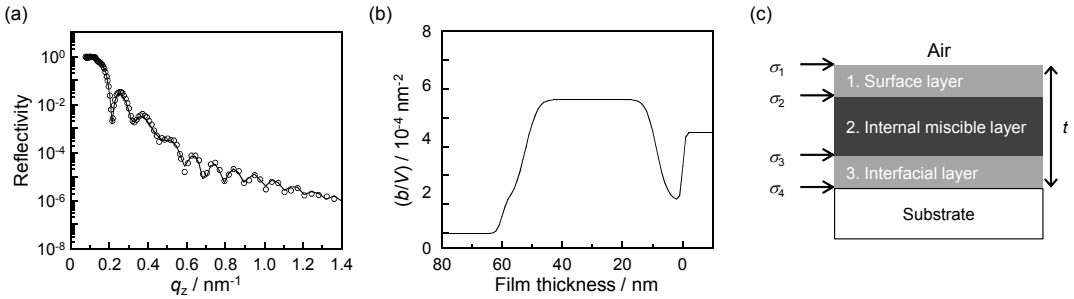

Fig. S1. (a) NR curve for the PMEA/dPMMA blend film in air. Open symbols depict the experimental data, and a solid line is the reflectivity calculated on the basis of (b) the (b/V) profile of the blend film in air. (c) A schematic illustration of the three layer model used for fitting. Here, t and σ_i represent the total film thickness and Gaussian roughness, respectively.

Table S1. Parameters used to fit the experimental reflectivity for the PMEA/dPMMA blend film in air shown in Fig. S1(a).

Film	(b/V) / 10^{-4} nm^{-2}			t / nm	σ_i / nm			
	$(b/V)_1$	$(b/V)_2$	$(b/V)_3$		σ_1	σ_2	σ_3	σ_4
PMEA/dPMMA	1.10	4.63	1.15	60.0	1.3	3.3	2.9	0.7

Contact angle measurements. Movie S1 shows the behavior of air bubbles on the PMEA/PMMA blend films (a) before and (b) after being immersed in water for 10 hours.

Fourier transform infrared (FT-IR) spectroscopy. As a sample, a bulk PMEA film was prepared onto an NaCl substrate by a solvent casting method. The film was dried under vacuum for 12 hours at room temperature. FT-IR spectrum of PMEA was recorded in vacuum in a wavenumber region (400 - 4000 cm^{-1}) at the resolution of 1 cm^{-1} on an FT/IR-620 Fourier transform infrared spectrometer (JASCO Corporation). The obtained spectrum was shown in Fig. S2.

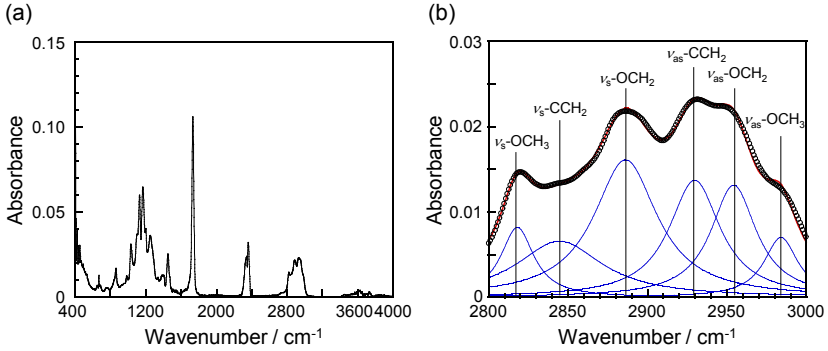

Fig. S2. (a) The FT-IR spectrum for a PMEA bulk film. (b) The enlarged spectrum of (a). While both red and blue curves are the curve-fitting results, the red one is the summation of the blue ones.

Reference

S1. R. A. L. Jones and R. W. Richards, *Polymers at Surfaces and Interfaces*, Cambridge University Press, 1999.