Protein Resistance of (Ethylene Oxide)$_n$ Monolayers at the Air/Water Interface: Effects of Packing Density and Chain Length

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Supplementary Information

S-1. Surface Pressure Change as a Function of Time for a Clean Air/Water Interface.

The apparatus stability was ascertained with a clean air/water interface. The surface pressure fluctuation is only ±0.02 mN/m within 800 min as shown in Figure S-1, indicating that the Langmuir balance is very stable.

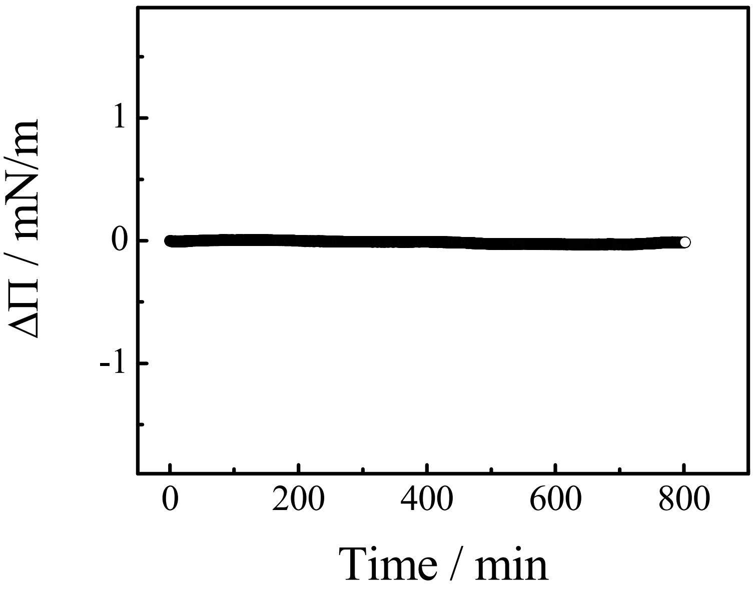

Figure S-1. Surface pressure change as a function of time for a clean air/water interface.

S-2. Π vs. σ^{-1} Isotherm of a PS_{108}-b-PEO_{114} Monolayer in the Range of σ^{-1}>30nm^2.

Figure S-2 shows the surface pressure-area isotherm of a PS_{108}-b-PEO_{114} monolayer in the range of σ^{-1}>30nm^2. It can be seen that the surface pressure gradually increases with increasing packing density, indicating that the individual pancake units gradually become dense pancake units due to the compression of the monolayer by the two barriers.

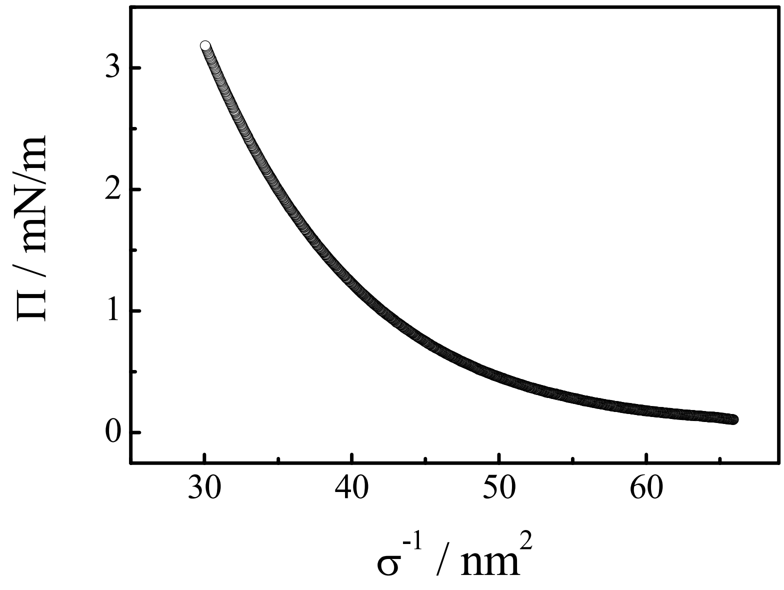

Figure S-2. Π vs. σ^{-1} isotherm of a PS_{108}-b-PEO_{114} monolayer in the range of σ^{-1}>30nm^2.

S-3. Equilibrium ΔΠ vs. σ^{-1} Induced by Adsorption of Fibrinogen at Different Concentrations.

Figure S-3 shows the packing density dependence of the surface pressure changes after adsorption of fibrinogen reaches equilibrium at different protein concentrations. It can be clearly seen that the adsorption has a similar trend for these two different concentrations. This demonstrates the good reproducibility of the experiment.

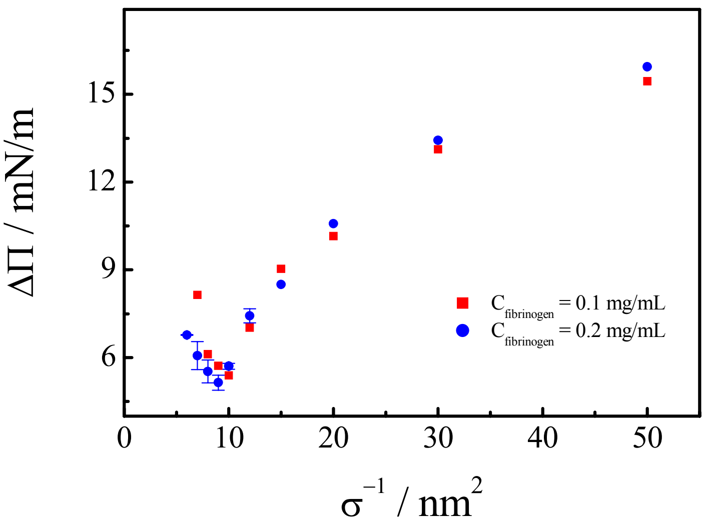

Figure S-3. ΔΠ vs. σ^{-1} induced by adsorption of fibrinogen at different concentrations.

S-4. Π vs. σ^{-1} isotherm of a PS_{108}-b-PEO_{114} monolayer with a compression-expansion cycle.

Figure S-4 shows Π vs. σ^{-1} isotherm of a PS_{108}-b-PEO_{114} monolayer with a compression-expansion cycle. It can be clearly seen that the surface pressure returns to the original point after one cycle, indicating that the PS blocks anchor PEO chains at the air/water interface stably even in the high surface pressure region, and they have not migrated into the subphase to produce dispersed micelles. The hysteresis observed in the compression-expansion cycle may be explained by the fact that some PEO chain segments (but not the whole PS_{108}-b-PEO_{114} diblock copolymer chain) immerge into the subphase. In addition, PS_{108}-b-PEO_{114} can hardly form a micelle in water when a solution of PS_{108}-b-PEO_{114} in chloroform is spread on a water surface due to the immiscibility of chloroform with water.

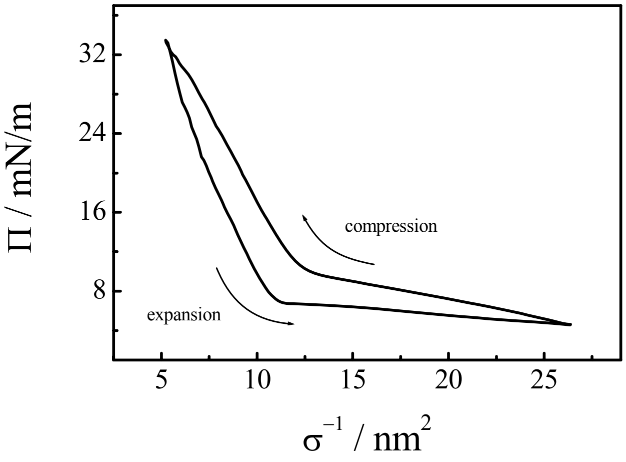

Figure S-4. Π vs. σ^{-1} isotherm of a PS_{108}-b-PEO_{114} monolayer with a compression-expansion cycle.