Supporting Information forPublication

The calculation of correlation function $K(z)$ was made in the following way on the basis of the observed 2D SAXS patterns shown in Figure 6. At first, the 2D-SAXS patterns were transformed to the 1D-scattering profiles by integrating the intensity along the line passing through the center and the scattering peak as a function of the scattering angle 2θ or a function of scattering vector q (= $4\pi\cdot\sin(\theta)/\lambda$, λ = X-ray wavelength = 1.00 Å). In this integration, the intensity correction must be made for the fibrous sample. That is to say, as discussed in the literature,[37,38] the scattering intensity from the cylindrical fibril is expressed as $I(q_1,q_2) \propto I_o(q_1)*(J_1(q_2R)/(q_2R))^2$, where $I_o(q_1)$ is the intensity from the infinitely wide fibril, J_1 is a Bessel function of the first order, and q_1 and q_2 are the scattering vector components along the axial and radial directions of the cylindrical fibril with a radius R. The R is roughly in an order of 100 Å. The term $(J_1(q_2R)/(q_2R))^2$ decreases sharply along the q_2 direction. Therefore, in order to obtain the scattering intensity $I_o(q_1)$ of the 1D-arrayed lamellae of infinitely large width, it is needed to correct the observed intensity as long as the integration covers an appreciably wide region of q_2. In the present case, the correlation function was calculated for the 1-dimensionally-stacked lamellar structure, and so the integration was performed over the relatively narrow q_2 range, about -0.01 ~ 0.01 Å^{-1} around the peak of the scattering intensity. So the correction was not made as the first approximation. Figure 11 (a) and (c) in the text show the thus-obtained 1D-SAXS profiles in the stretching and relaxing processes, respectively, from which the correlation function $K(z)$ were calculated using the following equation.[39,40]

$$K(z) \propto \int I(q) q^2 \cos(qz) \mathrm{d}q$$

where z is the correlation length between the stacked lamellae. Figure 11 (b) and (d) show a series of $K(z)$ calculated for all the observed SAXS profiles. The various points in the $K(z)$ curve give us the various information about the stacked lamellar structure as illustrated in Figure B1.[31,32] This information is available free of charge via the Internet at http://pubs.*acs.org/.*

References

(37) Bonart, R. *Kolloid Z. Z. Polym.*, **1964**, *194*, 97.

(38) Crist Jr, B, *J. Appl. Cryst.*, **1979**, *12*, 27.

(39) Guinier, A.; Fournet, G. *Small Angle Scattering of X-Rays*, **1955**, John Wiley, New York.

(40) Feigin, L. A.; Svergun, D. I. *Structure Analysis by Small-Angle X-ray and Neutron Scattering*, **1987**, Plenum Press, New York.

Figure B1 (a) Definition of stacked lamellar structural model and (b) the correlation function $K(z)$. The various structural parameters are obtained from the various points on the $K(z)$ curve.[39,40]

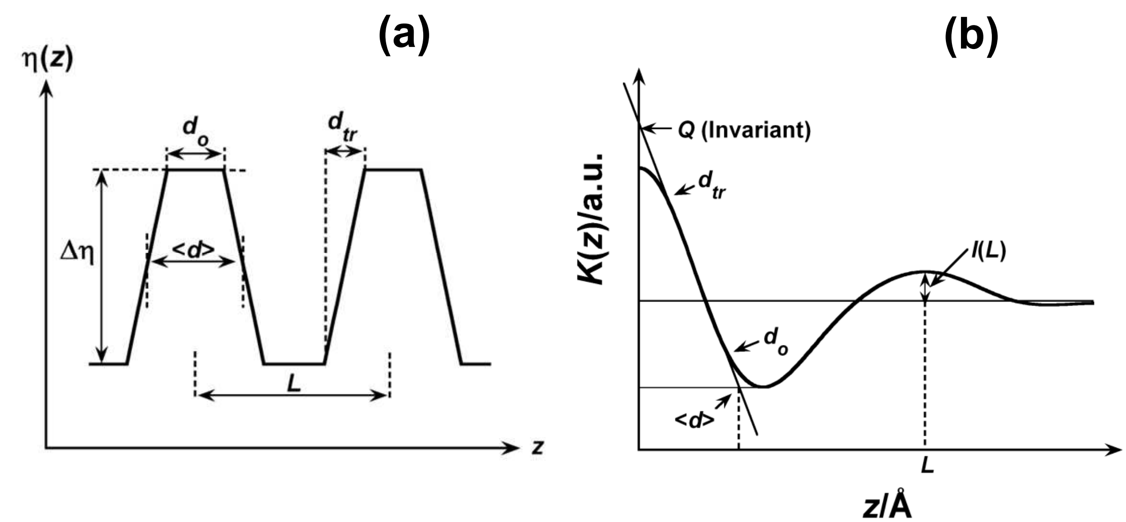

Figure B1