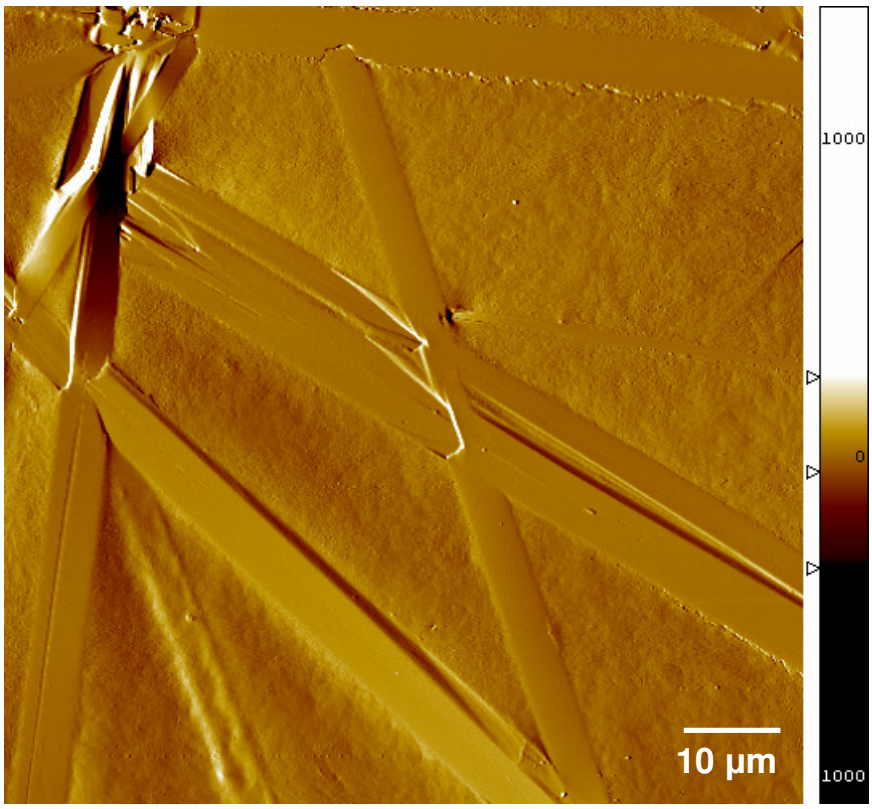
Self-assembled Helical Conjugated Poly(meta-phenylene) Derivatives that Afford Whiskers with Hexagonal Columnar Packed Structure

Kiyoshi Suda and Kazuo Akagi*

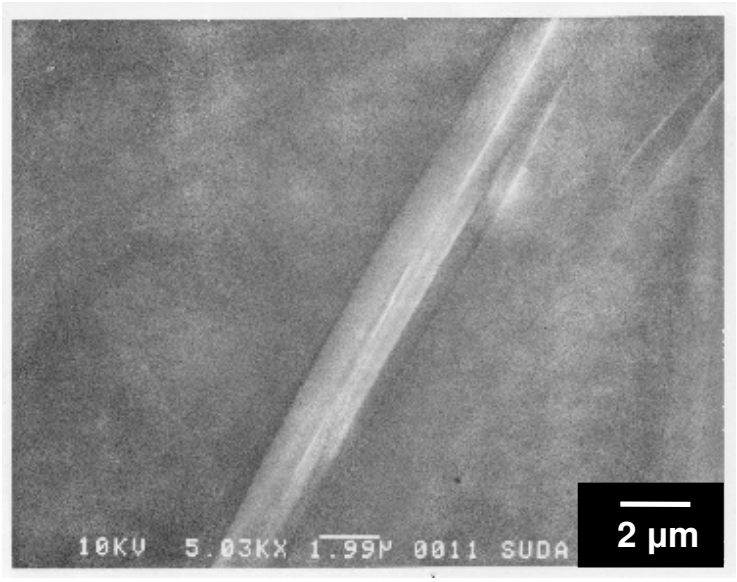
Department of Polymer Chemistry, Kyoto University, Katsura, Kyoto 615-8510, Japan,

E-mail: akagi@star.polym.kyoto-u.ac.jp

Supporting Information



(a)



(b)

Figure S1. (a) Photographs of atomic force microscope (AFM) height image and (b) scanning electron microscope (SEM) of **(*S*)-PMP** at room temperature in the solid state.

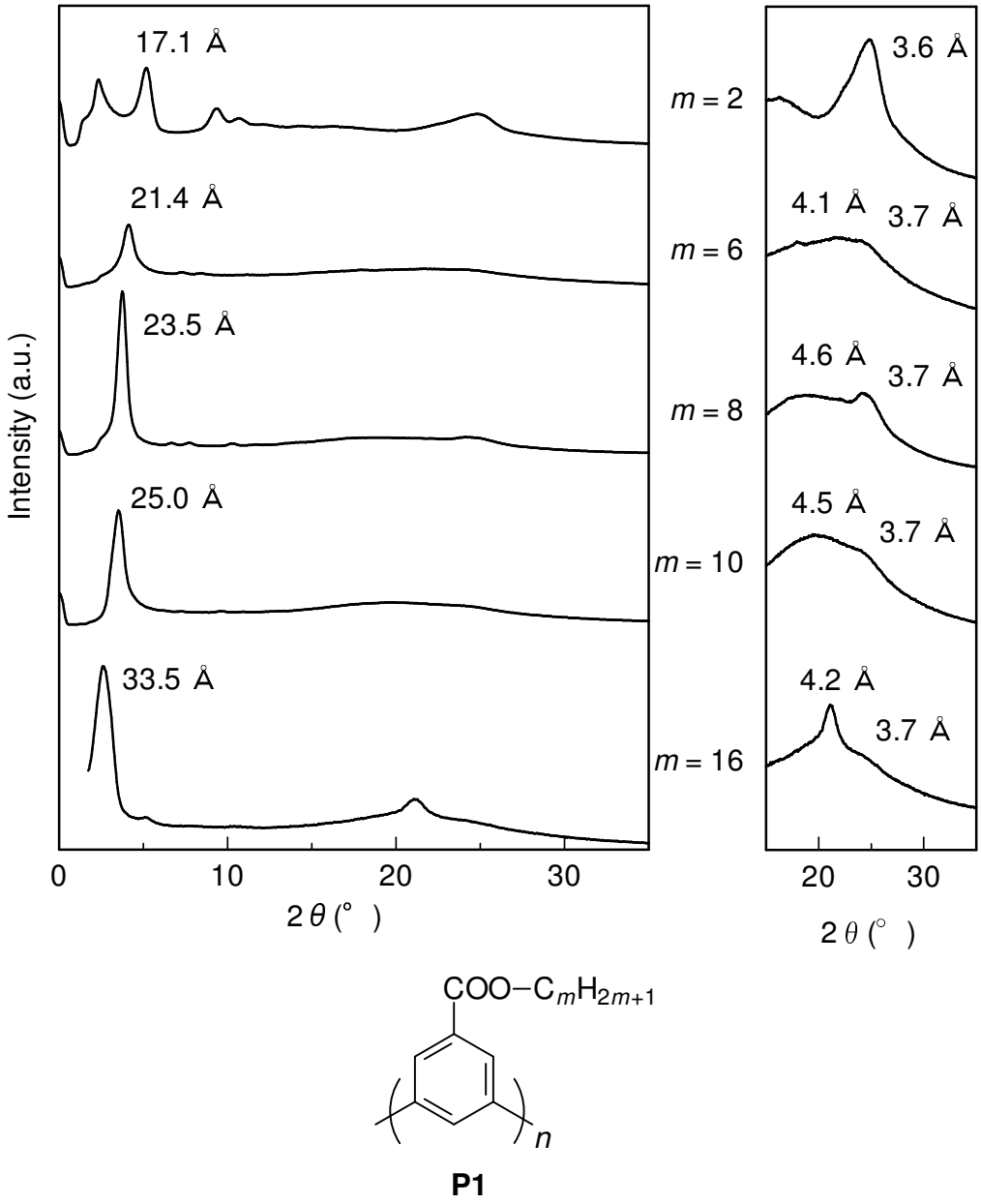


Figure S2. XRD profiles of **P1** polymers (m = 2 ~ 16) in the solid states after annealing from their mesophases.

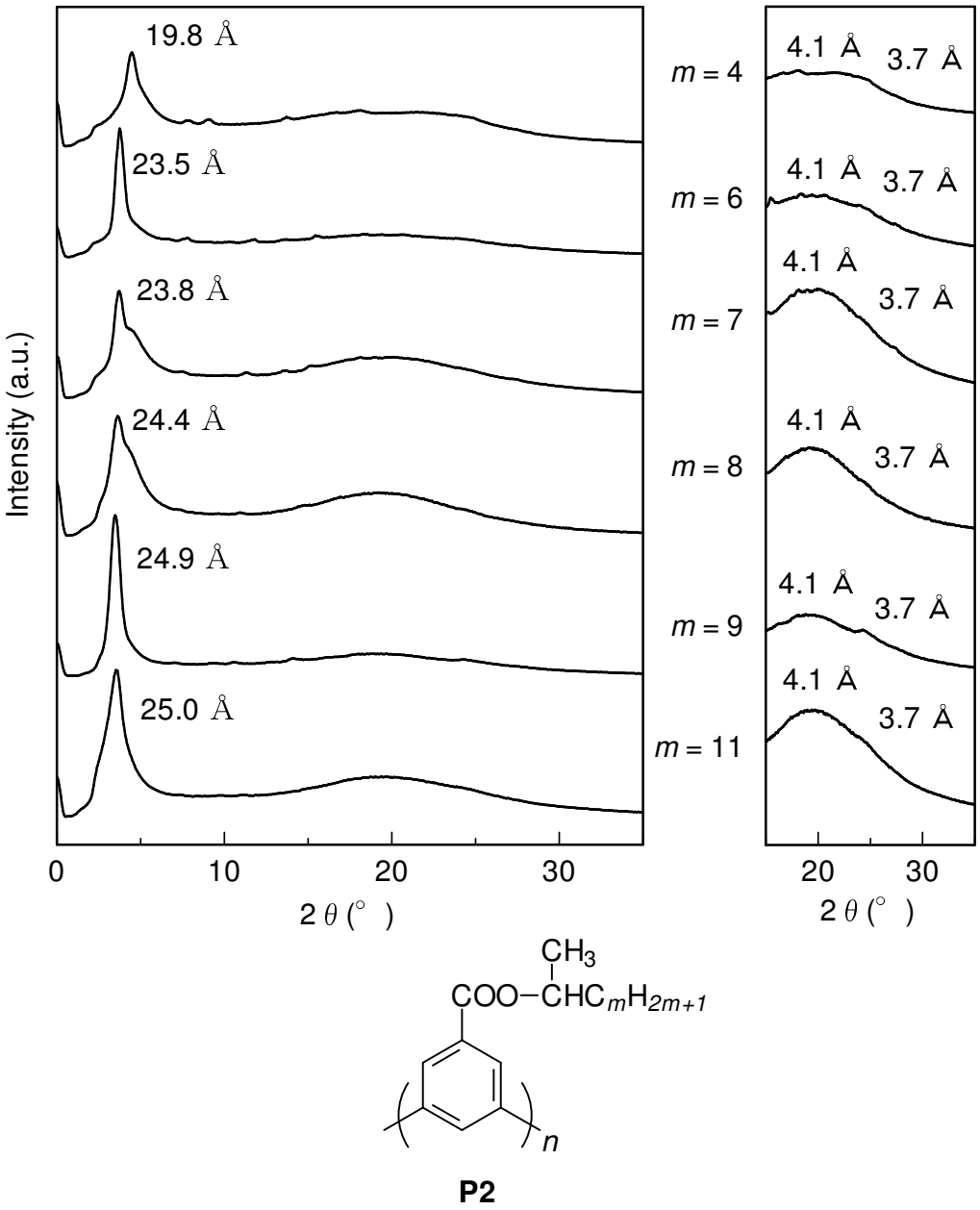


Figure S3. XRD profiles of **P2** polymers (m = 4 ~ 11) in the solid states after annealing from their mesophases.

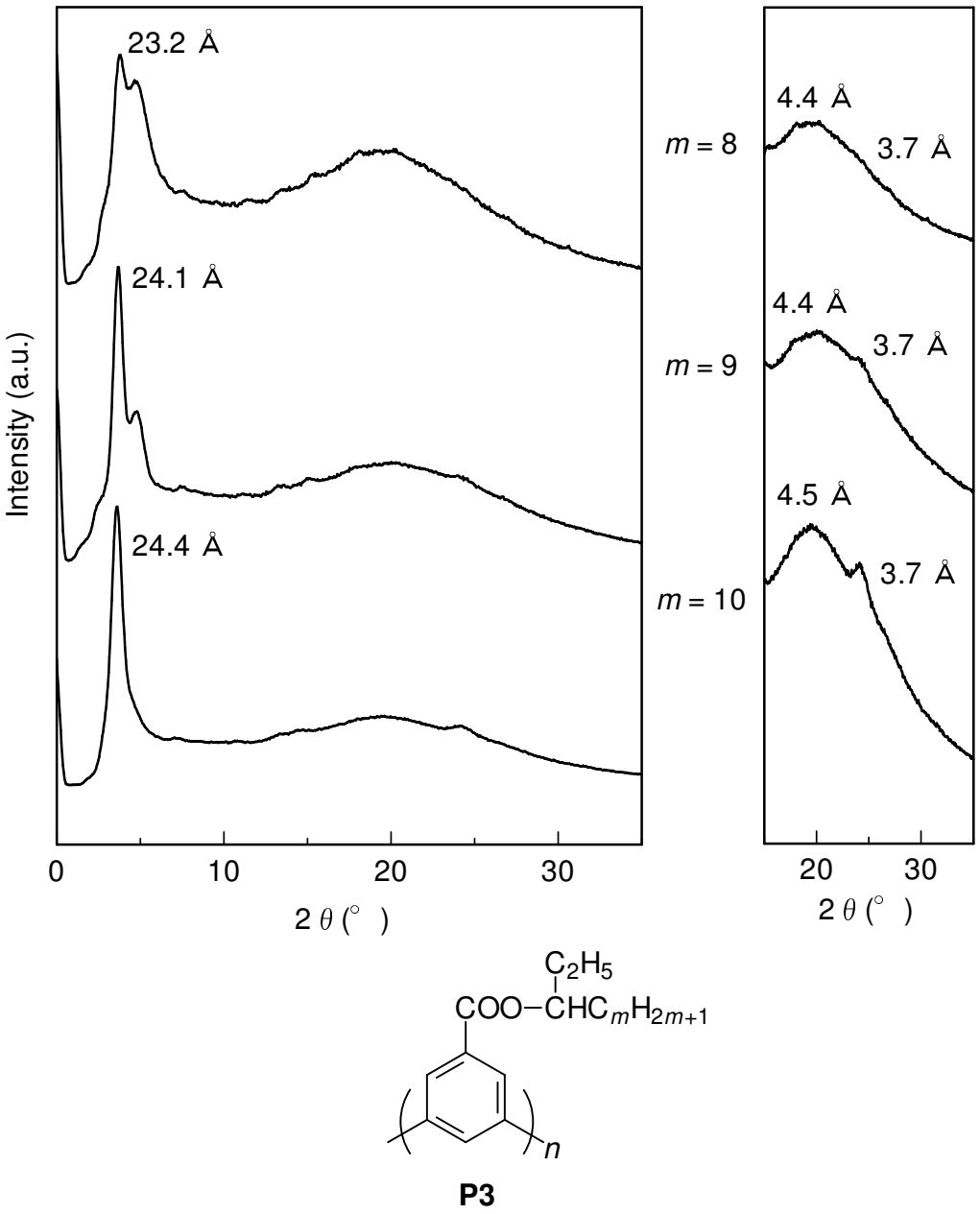


Figure S4. XRD profiles of **P3** polymers (m = 8 ~ 10) in the solid states after annealing from their mesophases.

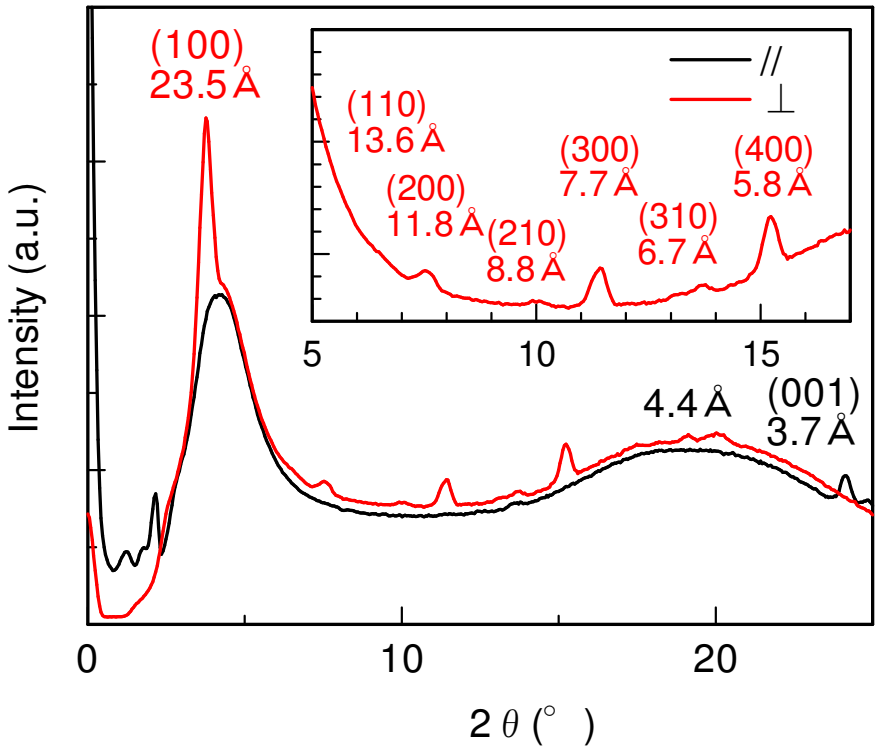


Figure S5. XRD profiles for aligned whisker of (***R***)**-PMP**.

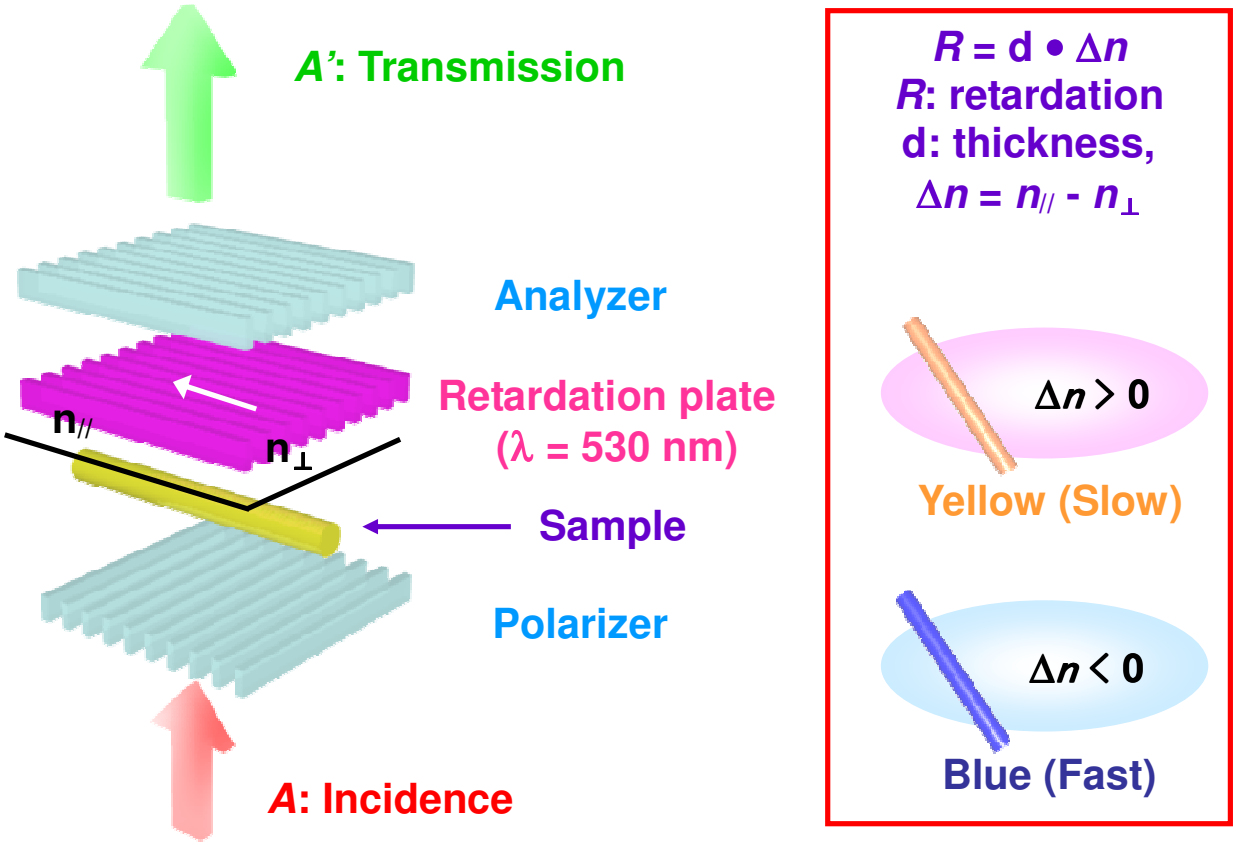


Figure S6. Method for measurement of refractive index. The aligned sample (the whisker) and the retardation plate (λ= 530 nm) are set between the polarizer and analyzer. The interference color is evaluated by changing the relative angle between the retardation plate and the sample. The interference color depends on the retardation (R) of the light, where the retardation is the product of the thickness (d) and the difference (Δn) of refractive index of the sample; $R = d \cdot \Delta n$, where $\Delta n = n_{//} - n_{\perp}$. As seen in the figure, the retardation plate is arranged parallel to the sample. In this case, when the interference color is blue, the Δn is negative. This indicates that the refractive index ($n_{//}$) parallel to the long axis of the sample is smaller than that ($n_{\perp}$) perpendicular to the long axis of the sample. It also means that the sample is negatively birefringent. When the interference color is yellow, the Δn is positive, implying that n . . . is larger than $n_{\perp}$ and hence the sample is positively birefringent.

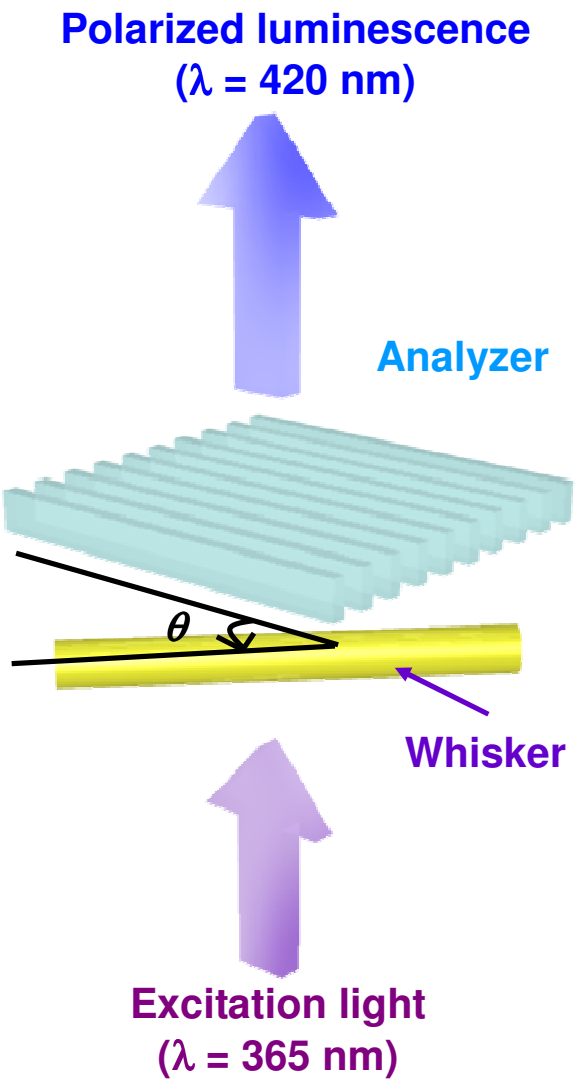


Figure S7. Method for observation of linearly polarized fluorescence. The sample of the aligned whisker is set in front of the analyzer plate. The sample is irradiated by the excitation light (λ = 365 nm). The polarized emission light is observer by changing the angle (θ) between the sample and the analyzer plate.