Supporting information

Magnetically Aligned Helical Liquid Crystal Field Allows Production of Polymer with Laser Diffraction and Prism Function

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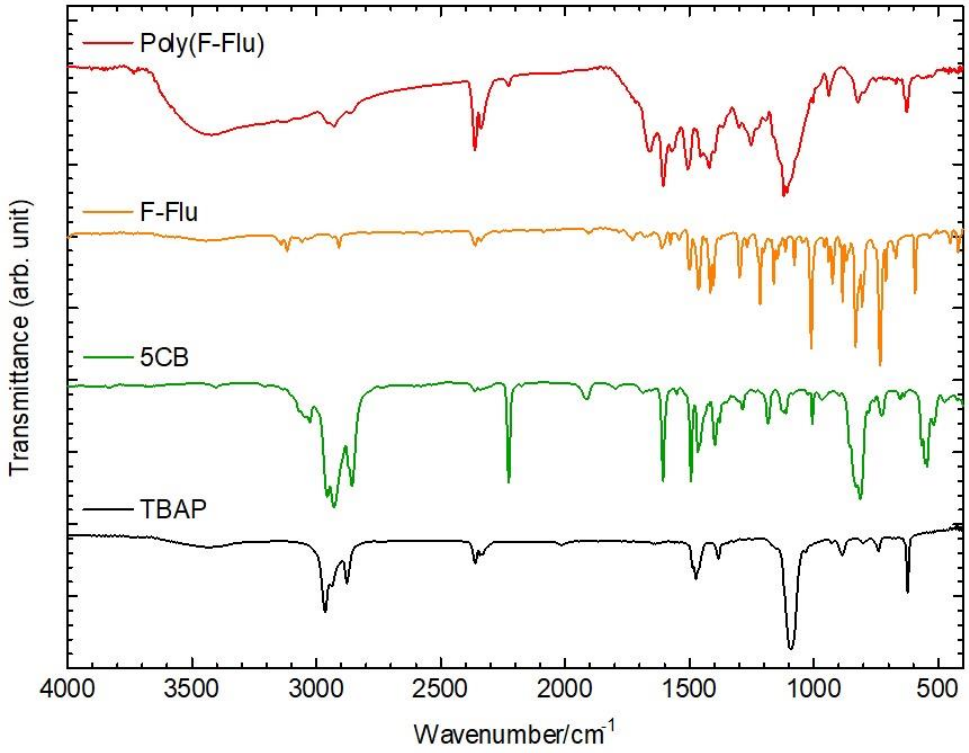

Figure S1. FT-IR spectra of poly(F-Flu) (red line), F-Flu (orange line), 5CB (green line) and TBAP (black line).

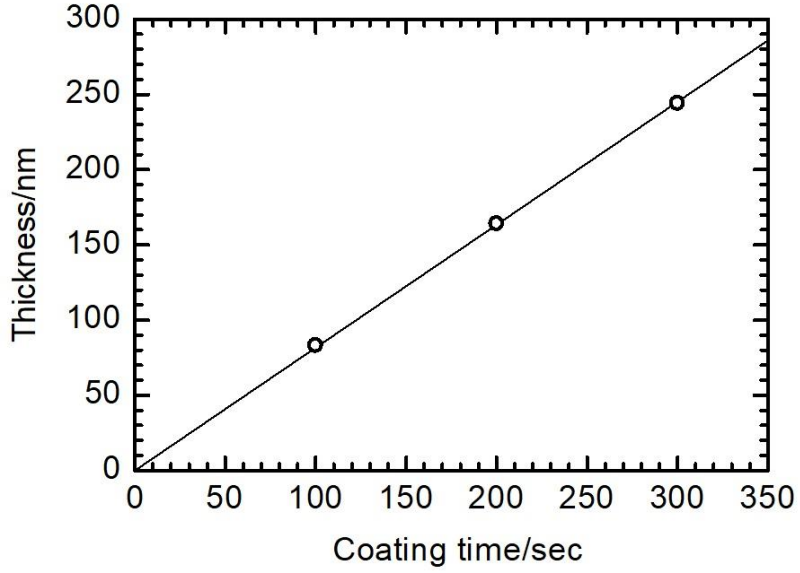

Figure S2. Deposition rate of silver coating.

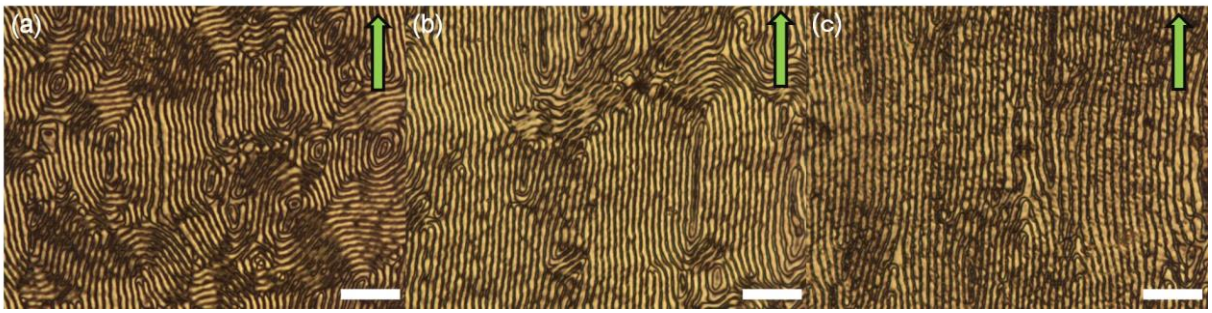

Figure S3. Polarizing optical microscopy (POM) images of poly(F-Flu) at applied magnetic field of 2 T (a), 4 T (b), and 8 T (c). All scale bars are 10 μm.

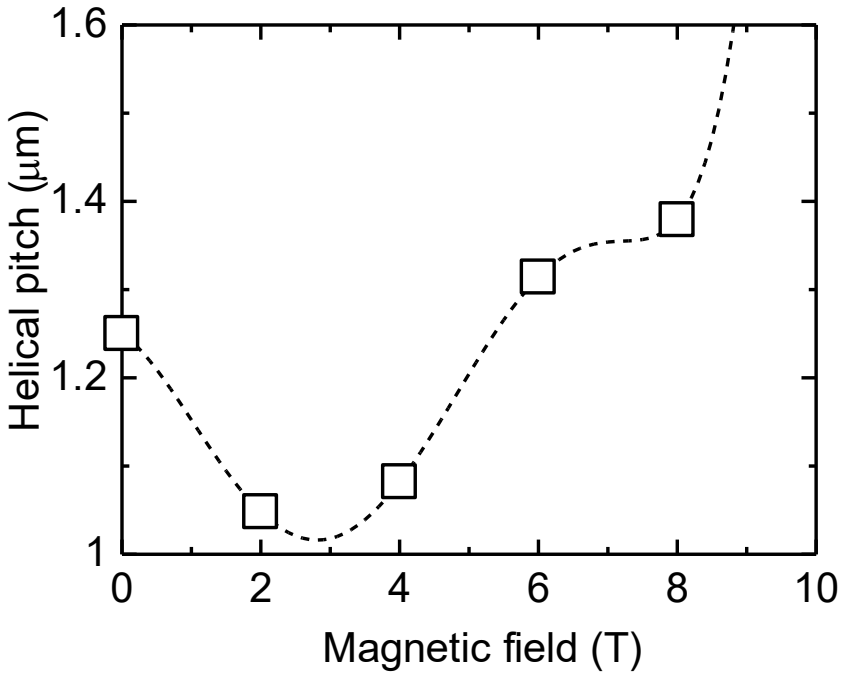

Figure S4. Change in helical pitch of the resultant polymer as a function of magnetic field strength during the polymerization.

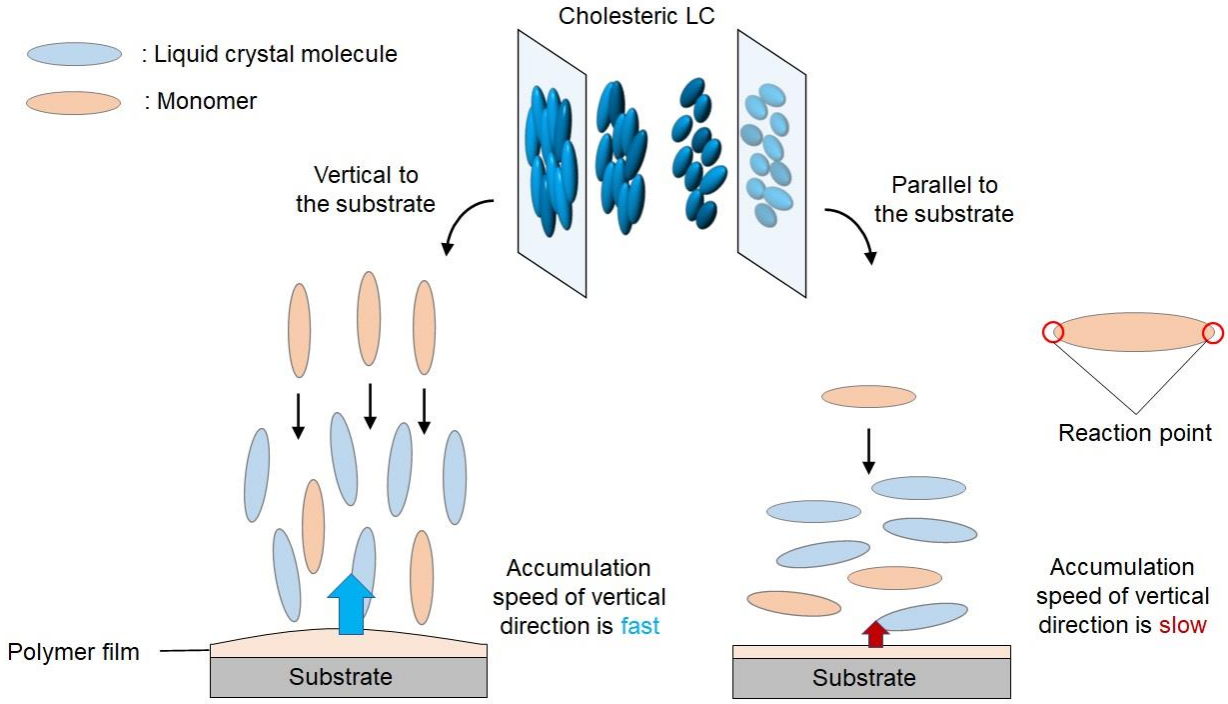

Figure S5. Plausible polymerization mechanism in cholesteric liquid crystal.

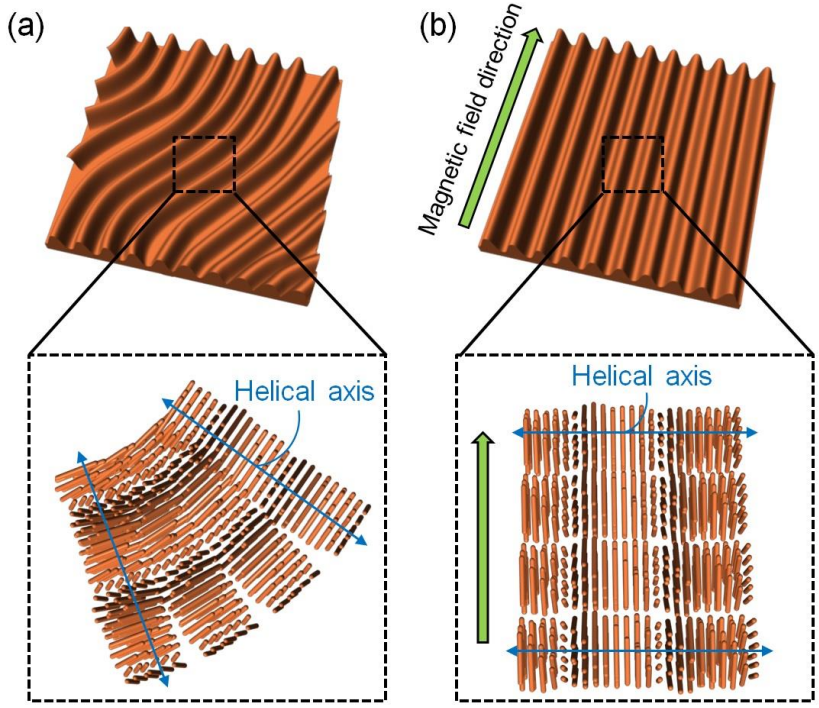

Figure S6. Schematic images of poly(F-Flu) with no magnetic field (a) and with 6 T (b). Green arrows show direction of applied magnetic field. Blue arrows show direction of helical axis.

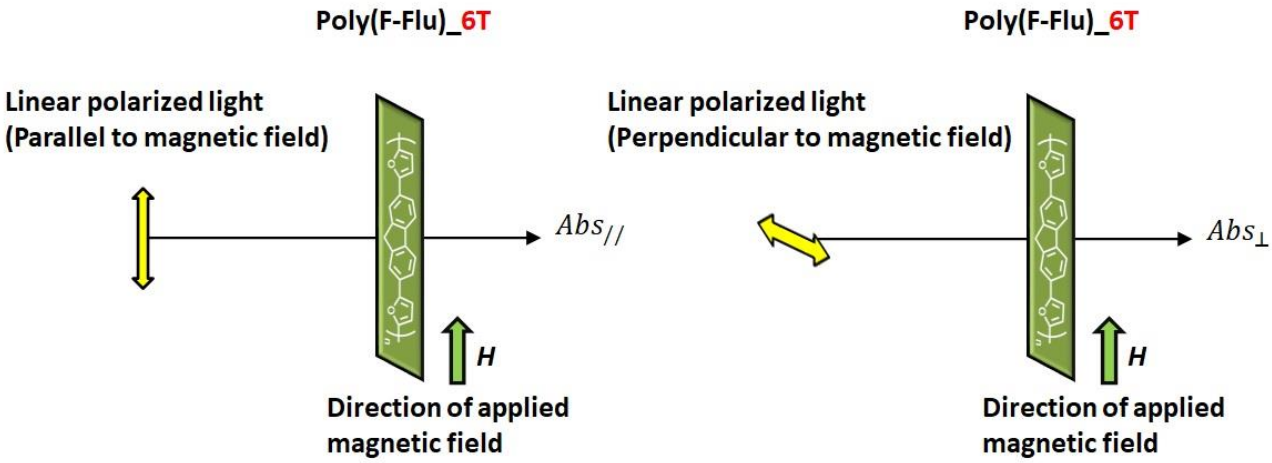

Figure S7. Schematic images of polymer orientation and polarized light.

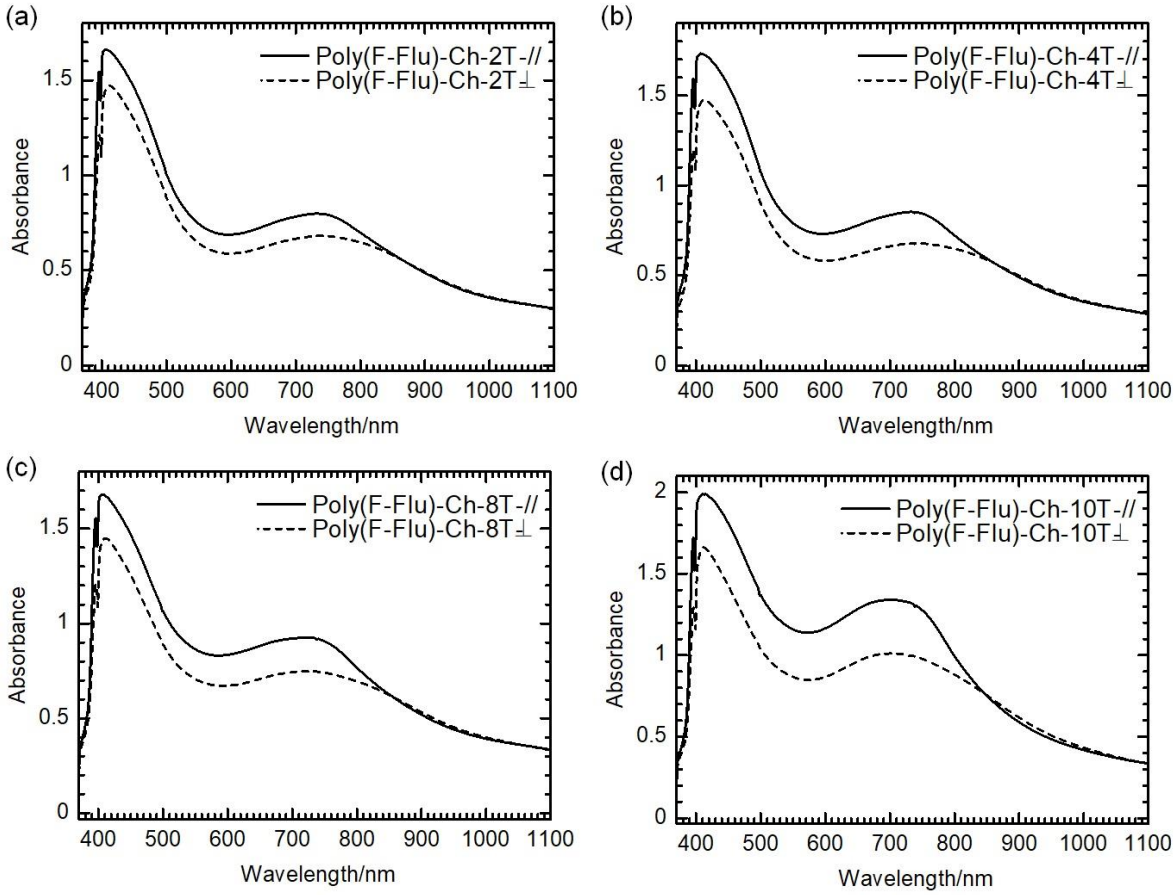

Figure S8. Linear polarized UV-vis absorption spectra of poly(F-Flu)-Ch-2T, 4T, 8T, and 10T. Absorption spectra of parallelly linearly polarized light (solid line) and perpendicularly linear polarized light (dashed line). (a): Absorptions of poly(F-Flu)-Ch-2T-// and poly(F-Flu)-Ch-2T-⊥. (b): Absorptions of poly(F-Flu)-Ch-4T-// and poly(F-Flu)-Ch-4T-⊥. (c): Absorptions of poly(F-Flu)-Ch-8T-// and poly(F-Flu)-Ch-8T-⊥. (d): Absorptions of poly(F-Flu)-Ch-10T-// and poly(F-Flu)-Ch-10T-⊥.

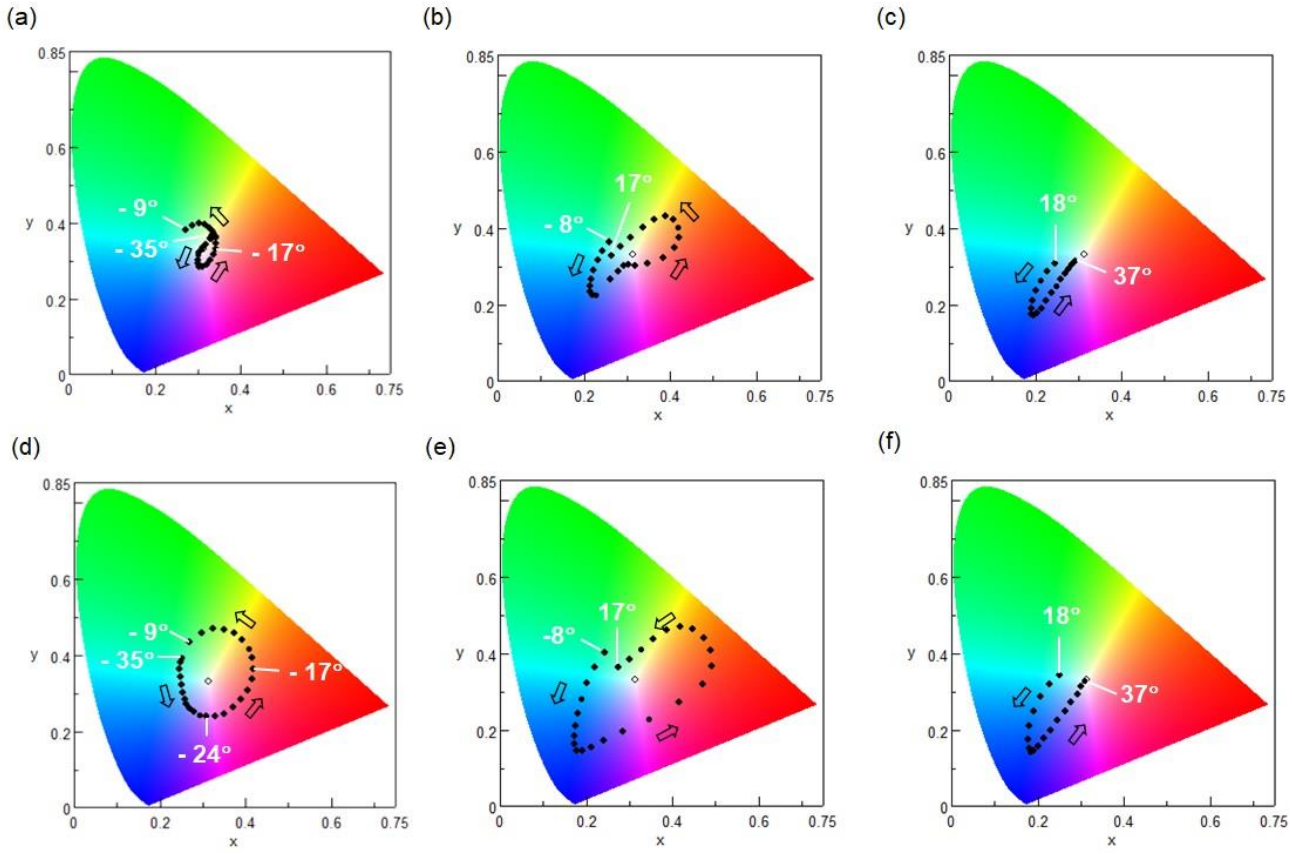

Figure S9. CIE color chromaticity of poly(F-Flu)-Ch-0T (a-c) and poly(F-Flu)-Ch-6T (d-f) film calculated from reflection spectra at detection angle scanned from –9 to 37°, respectively.

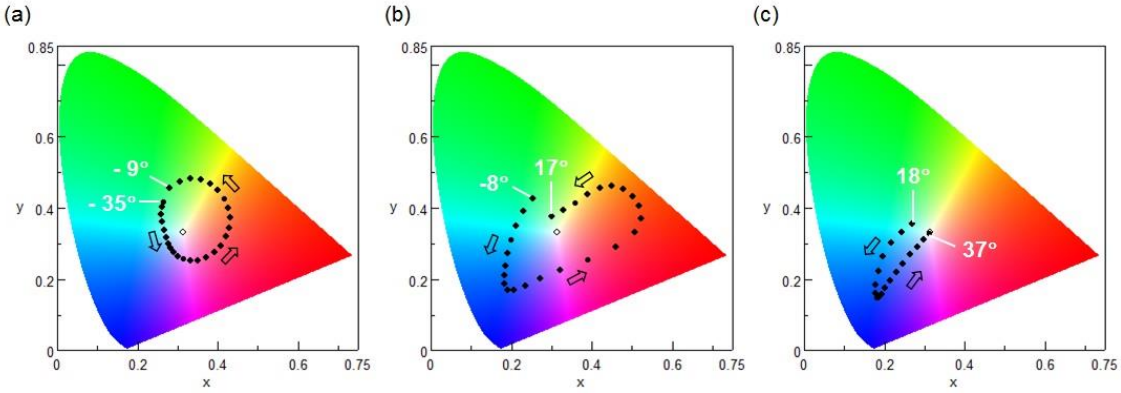

Figure S10. CIE color chromaticity of poly(F-Flu)-Ch-6T-Ag film at detection angle from –35 to –9° (a), –8 to 17° (b), and 18 to 37° (c).

View angle in Figure 8(e).

The diffraction color and diffraction angle of Figure 8e is corresponding to reflectance spectra of Figure 8d (–1 order region). Blue color diffraction light (Figure 8e, left) is corresponding to the reflection spectra at 22°, red color (Figure 8e, right) at 8°.

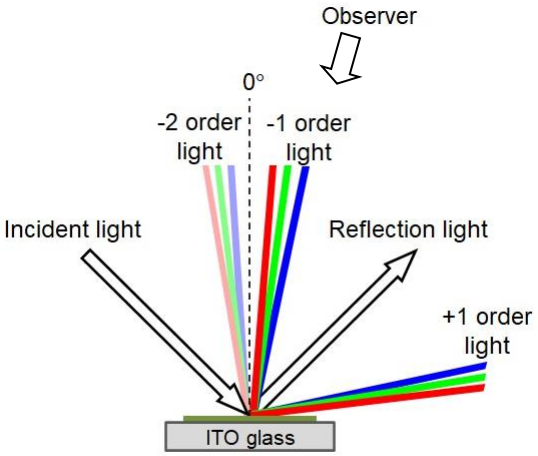

Figure S11. View angle for reflection color observations.