

Electronic supplementary information for
‘Dynamic Pattern Formation of Liquid Crystals Using
Binary Self-Assembled Monolayers on an ITO Surface
under DC Voltage

Takao Ishida^{a*}, Makiko Oyama^a, Kei-ichi Terada^{a§} and Masa-aki Haga^b

^a*Nanosystem Research Institute (NRI), National Institute of Advanced Industrial Science
and Technology (AIST), Tsukuba, Ibaraki 305-8564, Japan.*

^b*Department of Applied Chemistry, Chuo University, Kasuga, Bunkyo-ku,
Tokyo 112-8551, Japan.*

Videos

Video S1. Movie of microscope images of LC layers on SAM fully modified with octadecyl phosphonic acid (C18) (corresponds to Figures 3a–c).

Video S2. Movie of microscope images of LC layers on SAM fully modified with octyl phosphonic acid (C8) (corresponds to Figure S1).

Video S3. Movie of microscope images of LC layers on SAM fully modified with the Ru complex (corresponds to Figures 3d–f).

Video S4. Movie of microscope images of LC layers on SAM modified with hydrophilic propyl diphosphonic acid (C3) (corresponds to Figure S2).

Video S5. Movie of microscope images of LC layers on SAM for condition **A** (corresponds to Figures 4a–c).

Video S6. Movie of microscope images of LC layers on SAM for condition **B** (corresponds to Figures 4d–f).

Video S7. Movie of microscope images of LC layers on SAM for condition **C** (corresponds to Figures 4g–i).

Video S8. Movie of microscope images of LC layers on SAM fully modified with C18 and C8 (corresponds to Figures S4).

C8 only

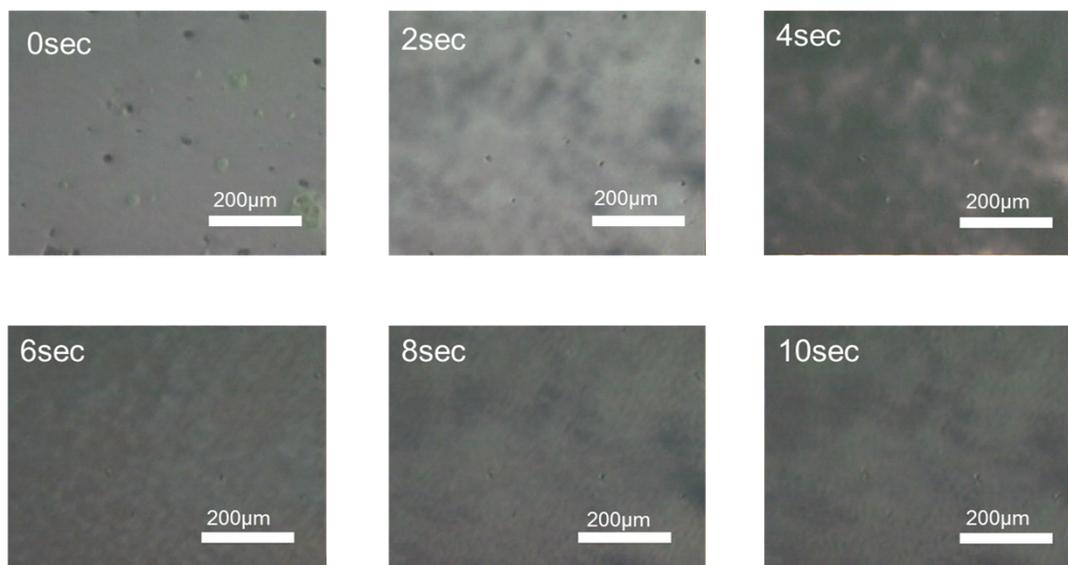


Figure S1. Series of polarizing microscope images of LC layers on SAM fully covered with octylphosphonic acid (C8).

C3 only

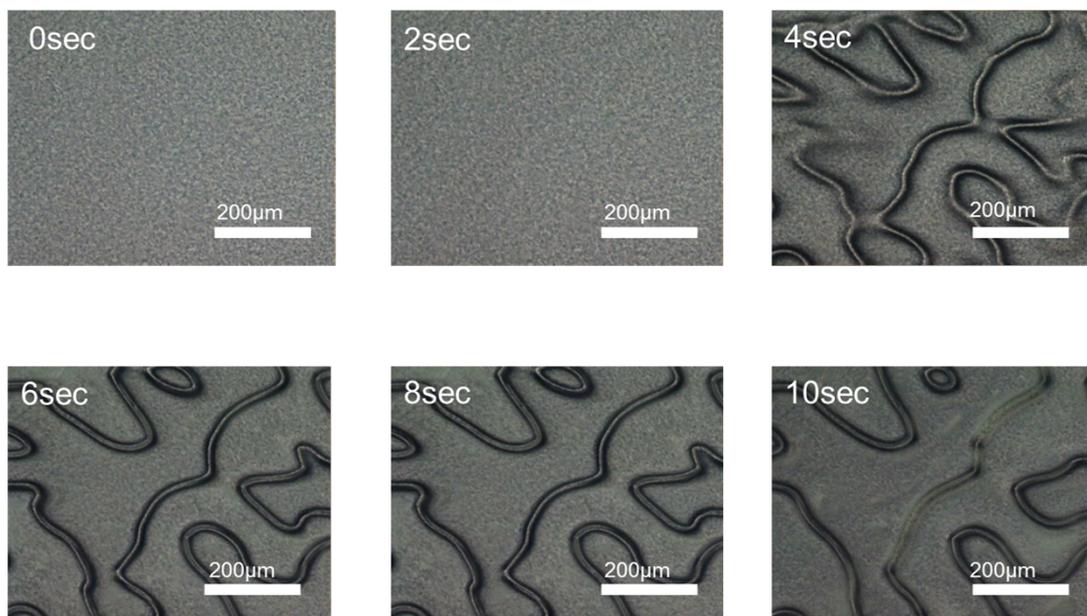


Figure S2. Series of polarizing microscope images of LC layers on SAM coated with hydrophilic propyl diphosphonic acid (C3).

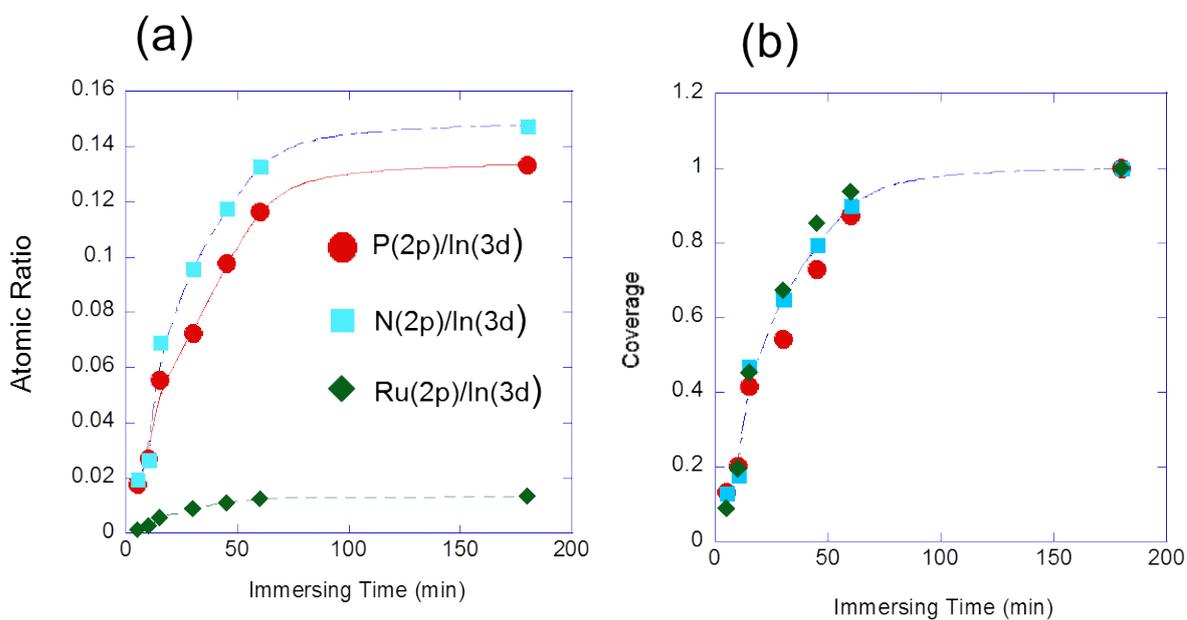


Figure S3. (a) Peak ratios of XPS against immersion time in solution containing Ru complex and (b) coverage of Ru complex on the ITO surface estimated by using the peak ratios. The estimated surface coverages of the Ru complex in conditions A (5 min), B (10 min), and C (30 min) are 13%, 21%, and 60%, respectively, before immersion in the C18 ethanol solution. The estimated mixing ratios of the Ru complex to C18 in conditions A, B, and C are 1:7, 1:4, and 3:2, respectively.

C8 + C18

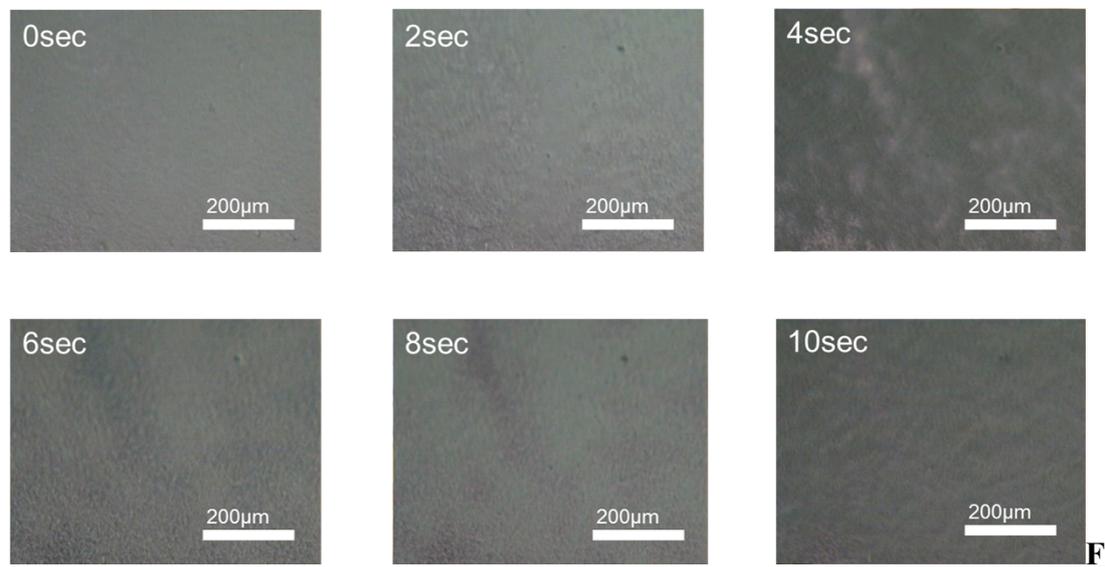


Figure S4.

Series of polarizing microscope images of LC layers on SAM coated with C18 and C8

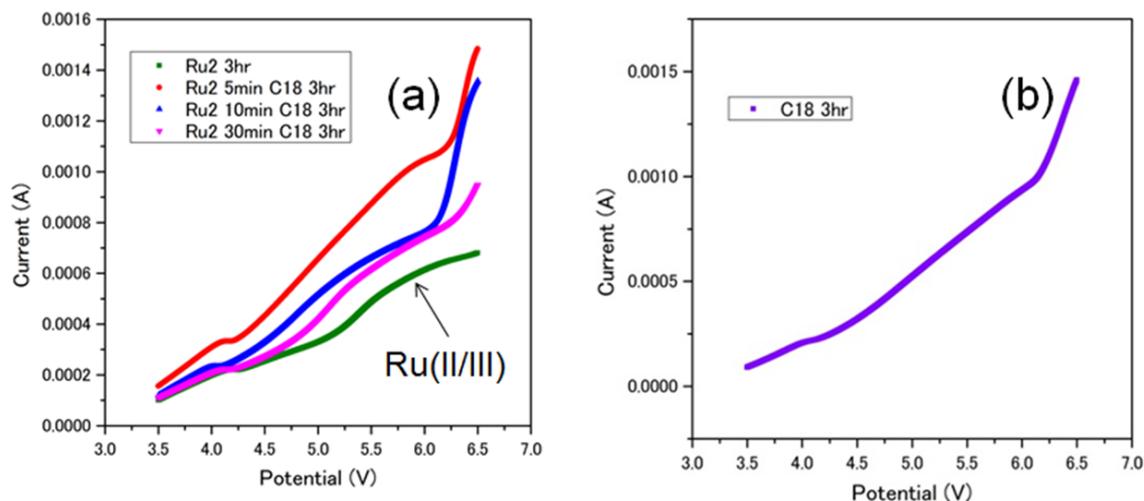


Figure S5. *I-V* curves of the LC cells. We defined the modified ITO surfaces as the working electrode. (a) *I-V* curves of mixed SAMs in conditions **A**, **B**, **C**, and mono-component Ru complex SAM and (b) *I-V* curve of C18 SAM. The red, blue, purple, and green lines correspond to mixed SAMs in conditions **A**, **B**, **C**, and mono-component Ru complex SAM, respectively.