Electronic Supplementary Material

Laser ablation of block copolymers with hydrogen-bonded azobenzene derivatives

Jintang Huang[1], Youju Huang (✉)[1], Si Wu (✉)[1,2]

1 Max Planck Institute for Polymer Research, Ackermannweg 10, 55128 Mainz, Germany

2 CAS Key Laboratory of Soft Matter Chemistry, Key Laboratory of Optoelectronic Science and Technology, Innovation Centre of Chemistry for Energy Materials, Department of Polymer Science and Engineering, University of Science and Technology of Hefei China, Hefei 230026, China

E-mails: huangyouju@mpip-mainz.mpg.de (Huang Y); wusi@mpip-mainz.mpg.de (Wu S)

According to previous FTIR studies, formation of hydrogen bonding between P4VP and phenols causes shifts of the stretching modes of pyridine rings because hydrogen bonding changes the electronic distributions in pyridine rings[1–4]. Figure S1 shows spectra of AzoCN, PS-b-P4VP and PS-b-P4VP(AzoCN)$_{0.5}$. The P4VP in the pure PS-b-P4VP has a characteristic stretching band at 993 cm^{-1} which shifts to 1011 cm^{-1} in PS-b-P4VP(AzoCN)$_{0.5}$. This result indicates that the hydrogen bonding between P4VP and AzoCN is formed.

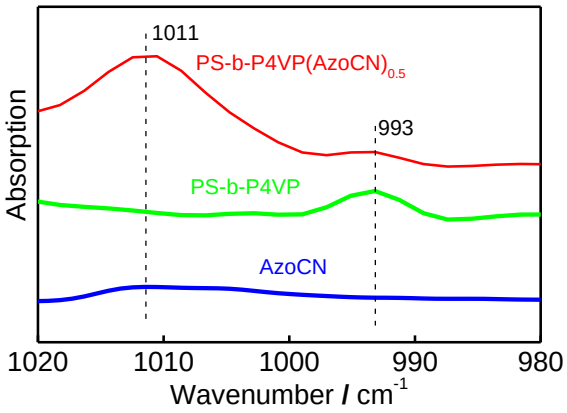

Fig. S1 FTIR spectra of AzoCN, PS-b-P4VP and PS-b-P4VP(AzoCN)$_{0.5}$

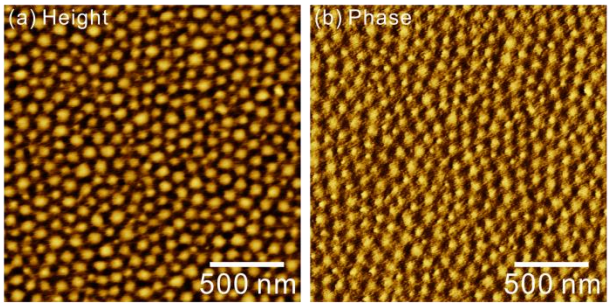

Fig. S2 AFM height (a) and phase (b) images of PS-b-P4VP(AzoCN)$_{0.5}$

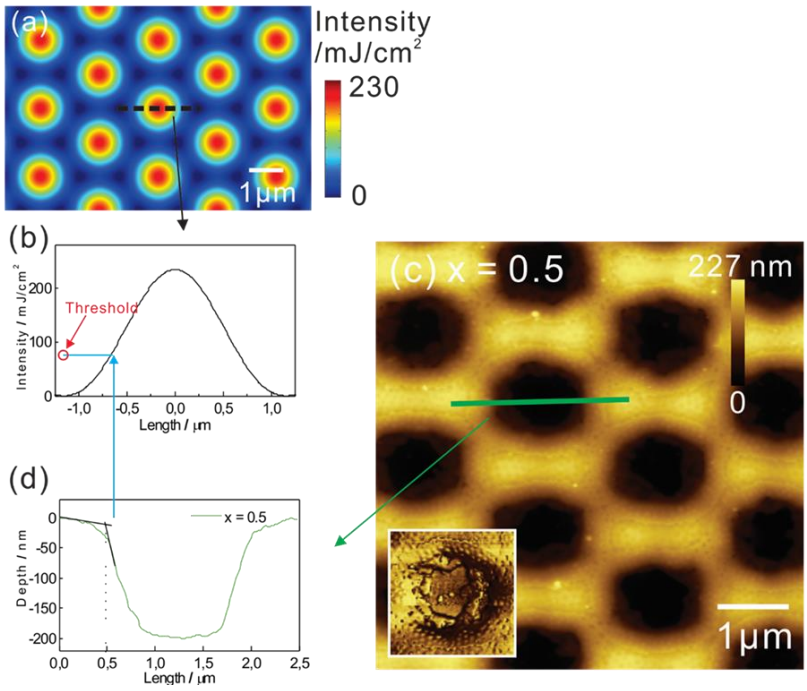

Fig. S3 Calculation of ablation thresholds. Intensity distribution (a) and profile (b) of three beam interference. AFM height image (c) and profile (d) of PS-b-P4VP(AzoCN)$_{0.5}$ after exposed to interference beams. The ablation threshold is calculated as follows: The point which starts to ablate is calculated on (d). Then, the corresponding laser intensity of this point (threshold) is calculated on (b).

References

1. Priimagi A, Vapaavuori J, Rodriguez F J, Faul C F J, Heino M T, Ikkala O, Kauranen M, Kaivola M. Hydrogen-Bonded Polymer-Azobenzene Complexes: Enhanced Photoinduced Birefringence with High Temporal Stability through Interplay of Intermolecular Interactions. Chemistry of Materials, 2008, 20(20): 6358-6363

2. Ruokolainen J, ten Brinke G, Ikkala O, Torkkeli M, Serimaa R. Mesomorphic structures in flexible polymer surfactant systems due to hydrogen bonding: Poly(4-vinylpyridine)-pentadecylphenol. Macromolecules, 1996, 29(10): 3409-3415

3. Sidorenko A, Tokarev I, Minko S, Stamm M. Ordered reactive nanomembranes/nanotemplates from thin films of block copolymer supramolecular assembly. Journal of the American Chemical Society, 2003, 125(40): 12211-12216

4. Wu S, Huang J T, Beckemper S, Gillner A, Wang K Y, Bubeck C. Block copolymer supramolecular assemblies hierarchically structured by three-beam interference laser ablation. Journal of Materials Chemistry, 2012, 22(11): 4989-4995