

Supporting Information

Photochromic Azobenzene Inverse Opal Film toward Dynamic Anti-Fake Pattern

Junchao Liu ², Zhitong Han ¹, Pingping Wu ³, Yuanyuan Shang ⁴, Jiansheng Chen ¹ and Pan Jia ^{1,*}

¹ Hebei Key Laboratory of Inorganic Nanomaterials, College of Chemistry and Material Science,
Hebei Normal University, Shijiazhuang 050024, China; hzt@stu.hebtu.edu.cn (Z.H.);
cjs@stu.hebtu.edu.cn (J.C.)

² School of Sciences, Xi'an University of Technology, Xi'an 710048, China;
liujunchao17@mailsucas.edu.cn

³ School of Chemistry and Chemical Engineering, Xi'an University of Architecture and Technology,
Xi'an 710055, China; pingpingwu@xauat.edu.cn

⁴ Hubei Key Laboratory of Processing and Application of Catalytic Materials, College of Chemistry and Chemical Engineering, Huanggang Normal University, Huanggang 438000, China; shangyuanyuan19@mailsucas.ac.cn

* Correspondence: jiafan@hebtu.edu.cn

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1. Fabrication process of AZOIO

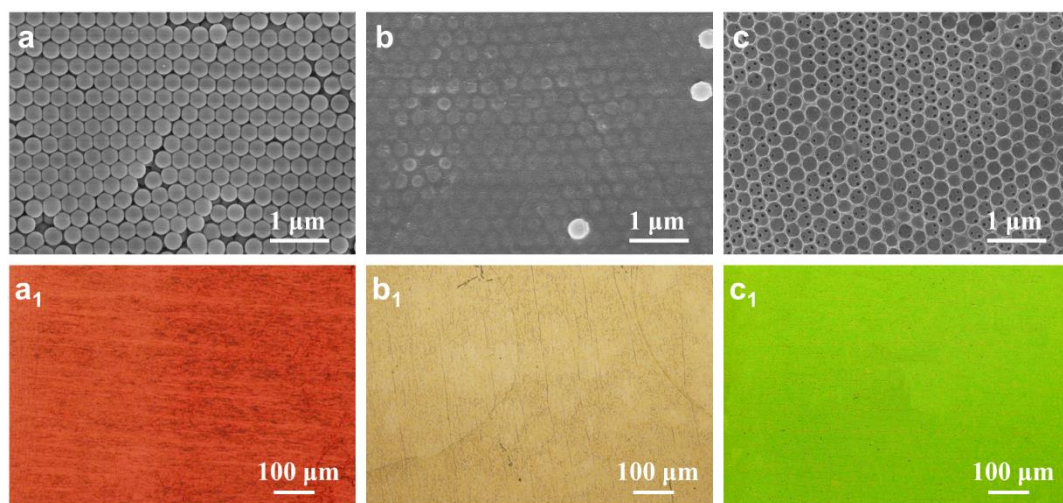


Figure S1. SEM and corresponding optical images of the fabrication process for AZOIOs. (a, a₁) SiO₂ opal template, (b, b₁) composite opal (the interstice of SiO₂ opal template was infiltrated by LC precursor), and (c, c₁) AZOIOs.

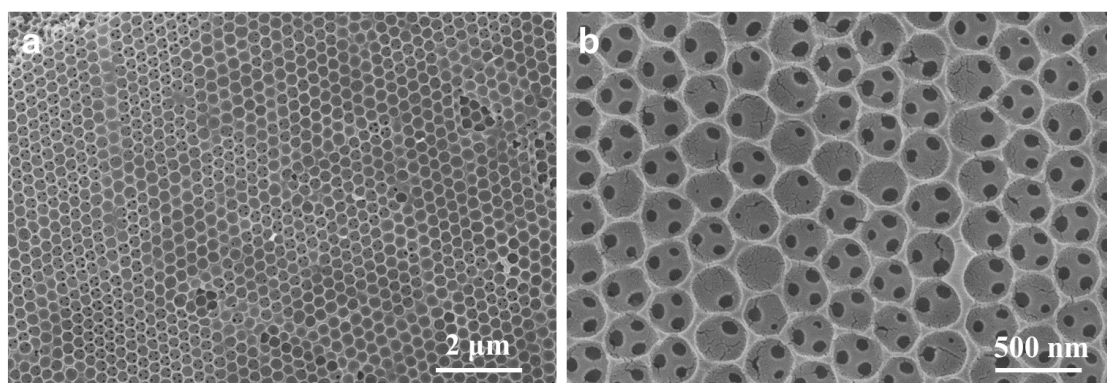


Figure S2. SEM images of the as-prepared AZOIOs.

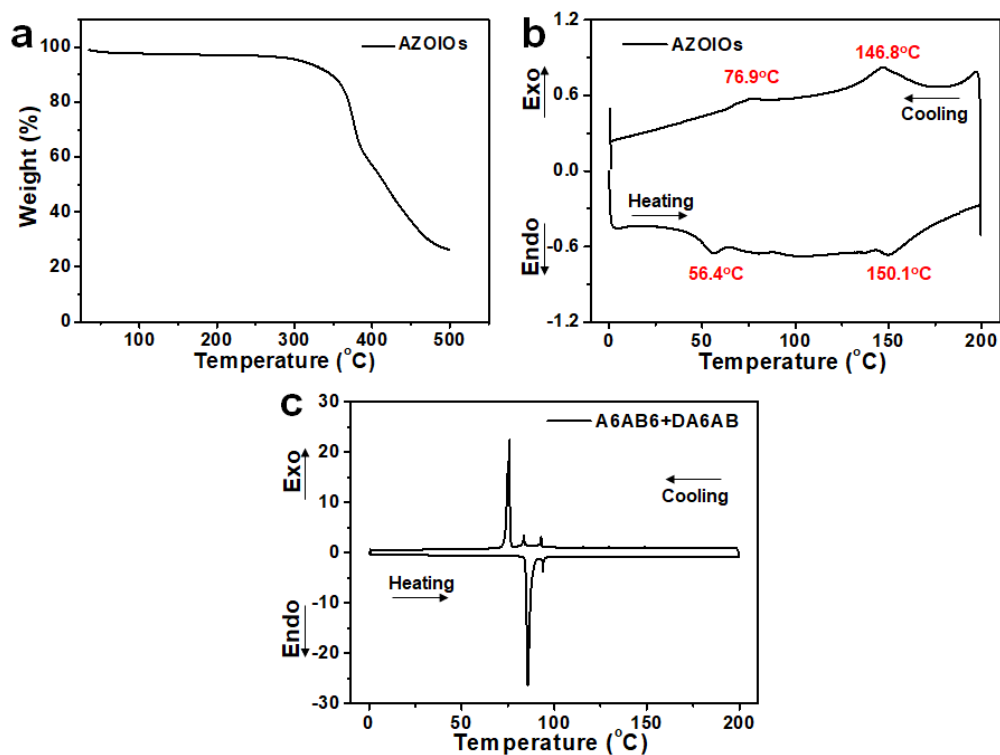


Figure S3. (a) TGA of AZOIOs. (b) DSC curves from the second scan (± 10 °C/min) of AZOIOs. (c) DSC curves from the second scan (± 10 °C/min) of the monomeric mixture.

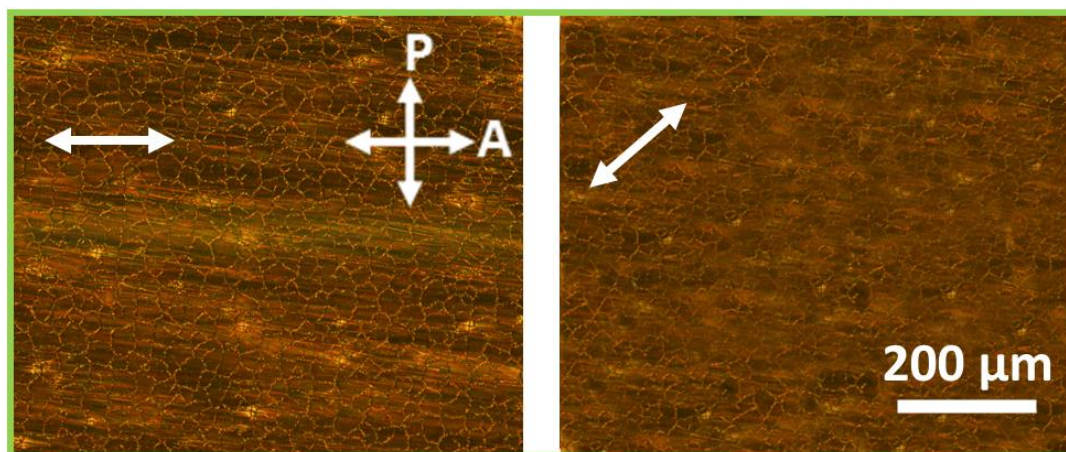


Figure S4. POM images of AZOIOs. P: polarizer, A: analyzer.

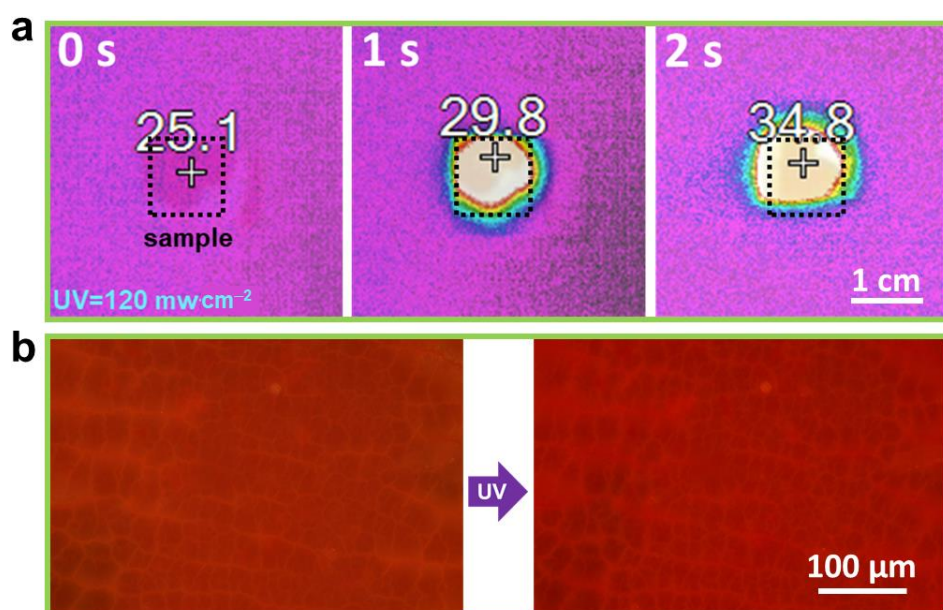


Figure S5. (a) The temperature change of AZOIOs under UV irradiation (120 mW/cm², 2 s). (b) POM images of AZOIOs before and after UV irradiation (120 mW/cm², 2 s).

2. The modulation effect of AZOIOs' bandgap and photo-isomerization on fluorescent property

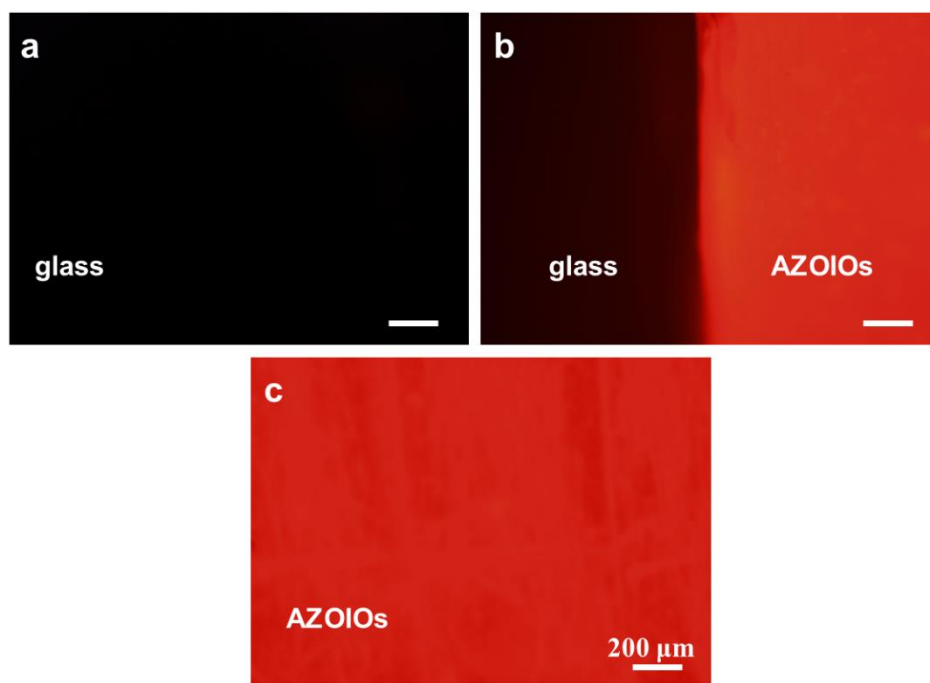


Figure S6. Fluorescent images of (a) glass, (b) the boundary of AZOIOs, and (c) AZOIOs.

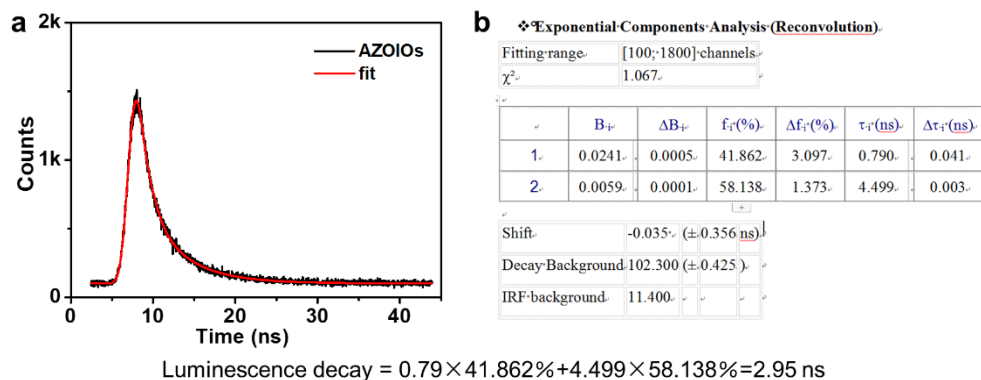


Figure S7. The luminescence decay of AZOIOs when excited at 560 nm.

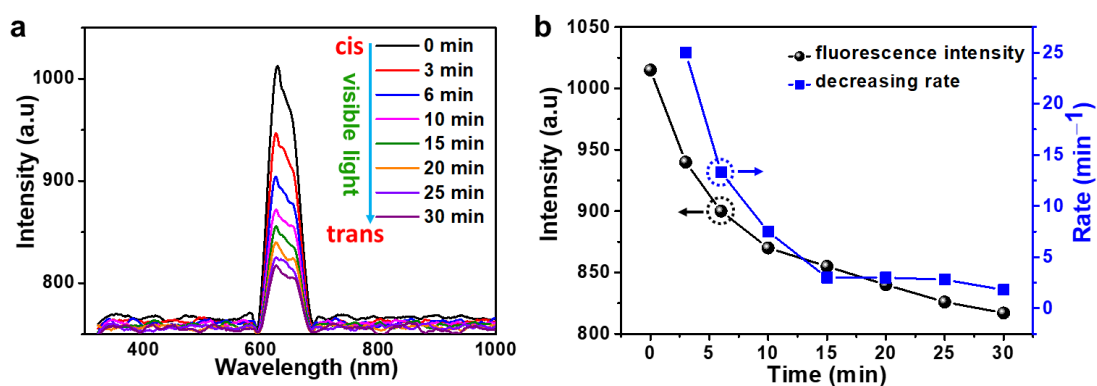


Figure S8. (a) The fluorescent intensity changes of the *cis*-bulk azobenzene polymer (a fresh bulk azobenzene polymer irradiated by 30 mW/cm² UV light for 1 min) under visible irradiation (10 mW/cm²) for different time. (b) The transformation of fluorescent intensity and fluorescent decreasing rate for *cis*-bulk azobenzene polymer as a function of visible irradiation time.

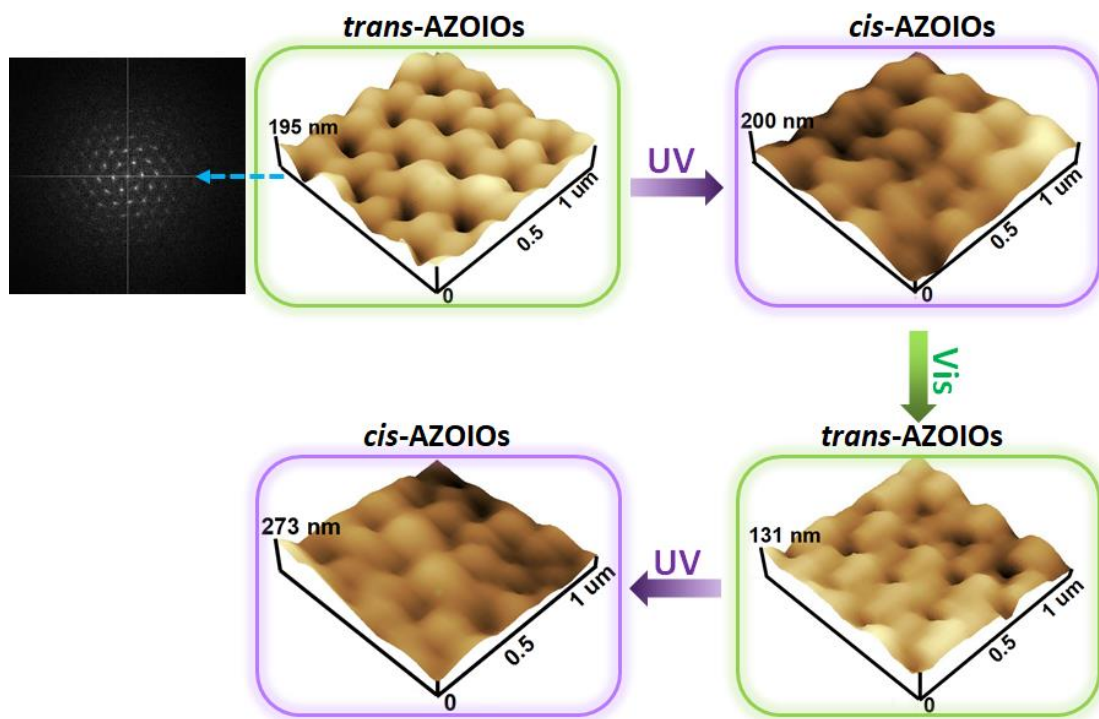


Figure S9. AFM images of the AZOIOs under alternating UV/vis irradiation and the corresponding Fourier transform.

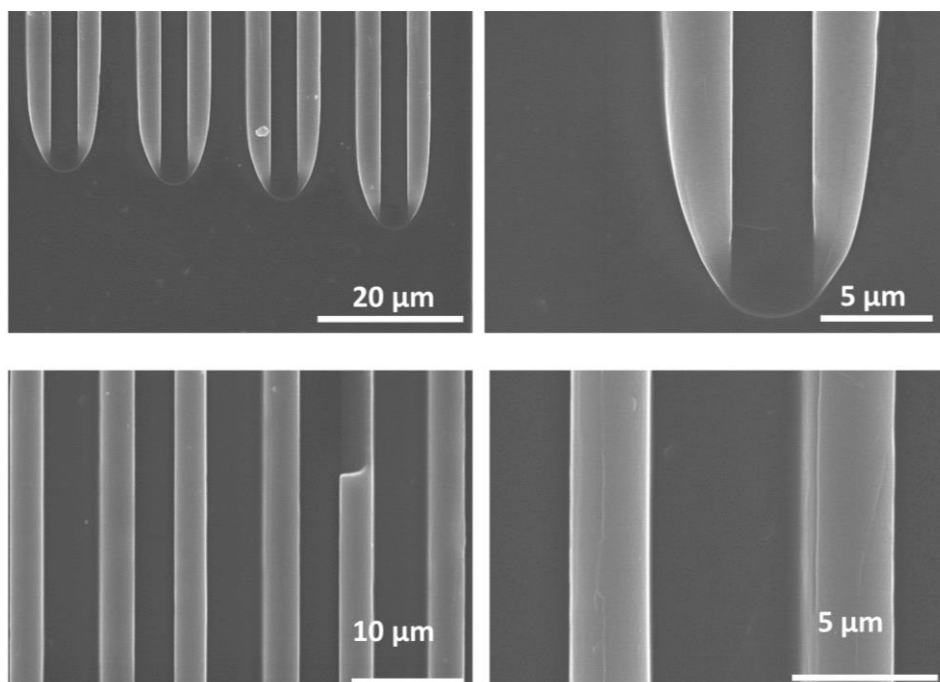


Figure S10. SEM images of the patterned bulk azobenzene polymer on a cover glass.

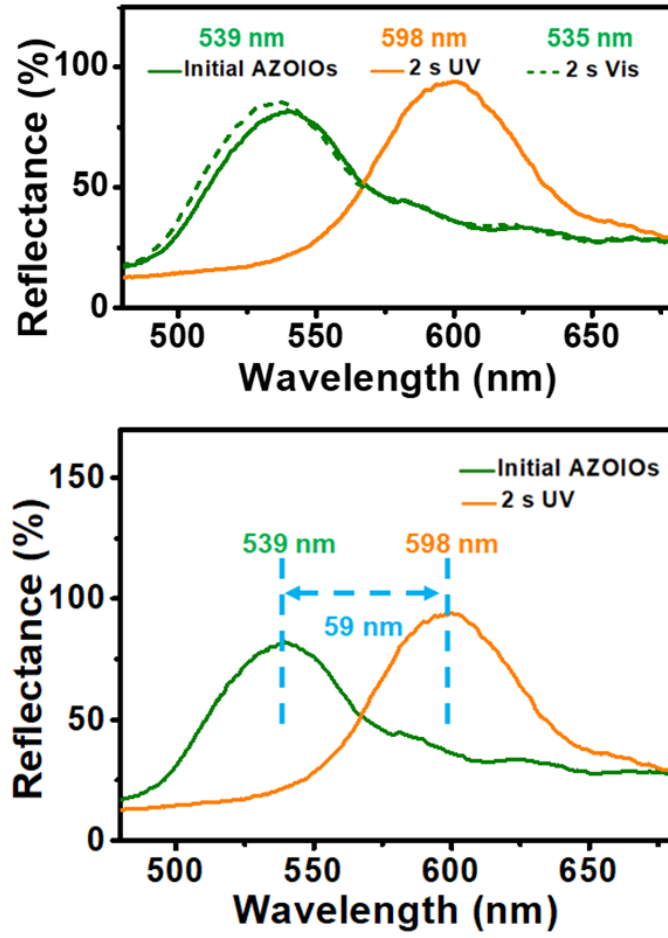


Figure S11. Reversible bandgap shift of AZOIOs under alternating UV (365 nm, 120 mW/cm²) and visible (560 nm, 120 mW/cm²) irradiation.

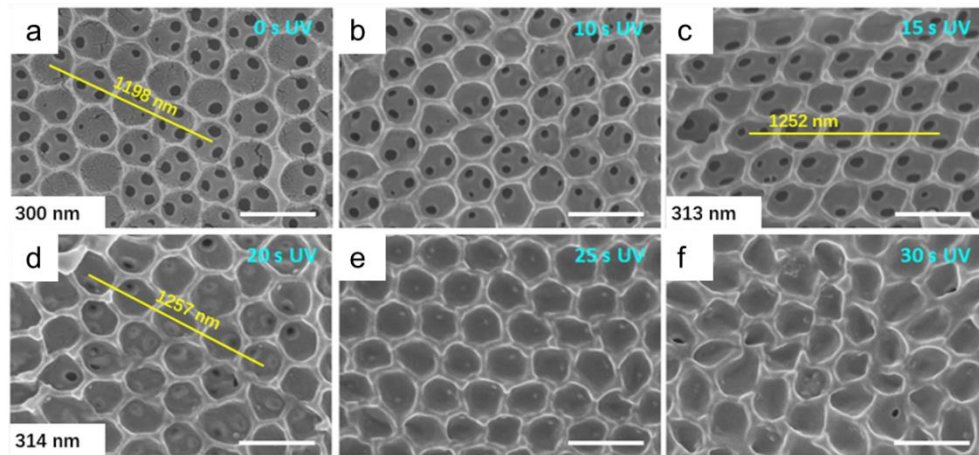


Figure S12. SEM images of the AZOIOs after UV irradiation (20 mW/cm²) with different time. (a) 0 s; (b) 10 s; (c) 15 s; (d) 20 s; (e) 25 s; (f) 30 s.

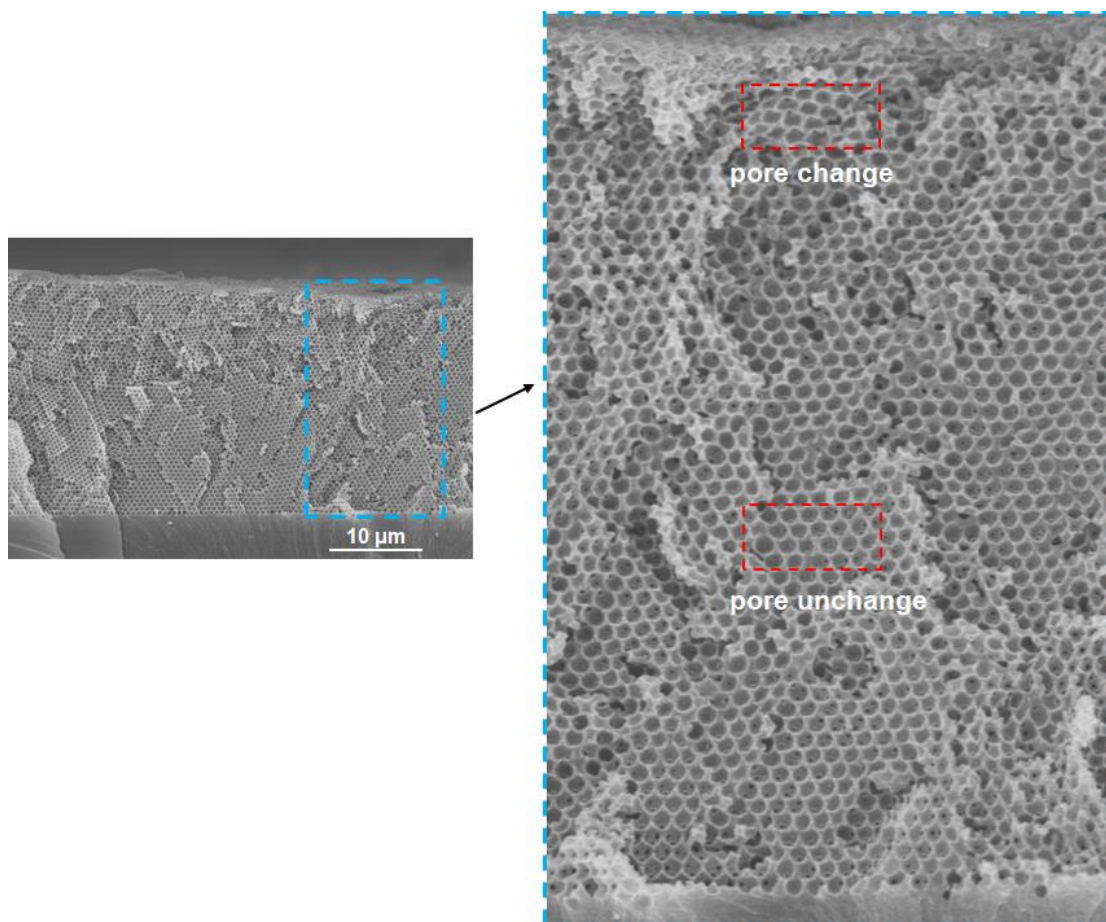


Figure S13. Side-view SEM images of the AZOIOs after UV irradiation (20 mW/cm², 20 s).

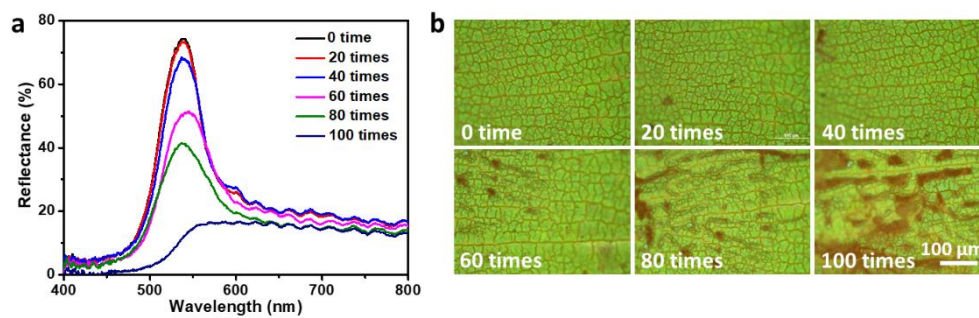


Figure S14. In-situ observation of (a) reflection spectra and (b) the corresponding optical images of AZOIOs after different abrasion times.