# PHOTOSWITCHING OF GLASS TRANSITION TEMPERATURES OF AZOPOLYMERS INDUCES REVERSIBLE SOLID-TO-LIQUID TRANSITIONS

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I will present that light can switch the Tg of azobenzene-containing polymers (azopolymers) and induce reversible solid-to-liquid transitions of the polymers.[1-3] The azobenzene groups in the polymers exhibit reversible cis-trans photoisomerization. Trans azopolymers are solids with Tg above room temperature, while cis azopolymers are liquids with Tg below room temperature. Because of the photoinduced solid-to-liquid transitions of these polymers, light can reduce the surface roughness of azopolymer films, repeatedly heal cracks in azopolymers, and control the adhesion of azopolymers for transfer printing. The photoswitching of Tg provides a new strategy for designing healable polymers with high Tg and allow for control over the mechanical properties of polymers with high spatiotemporal resolution.

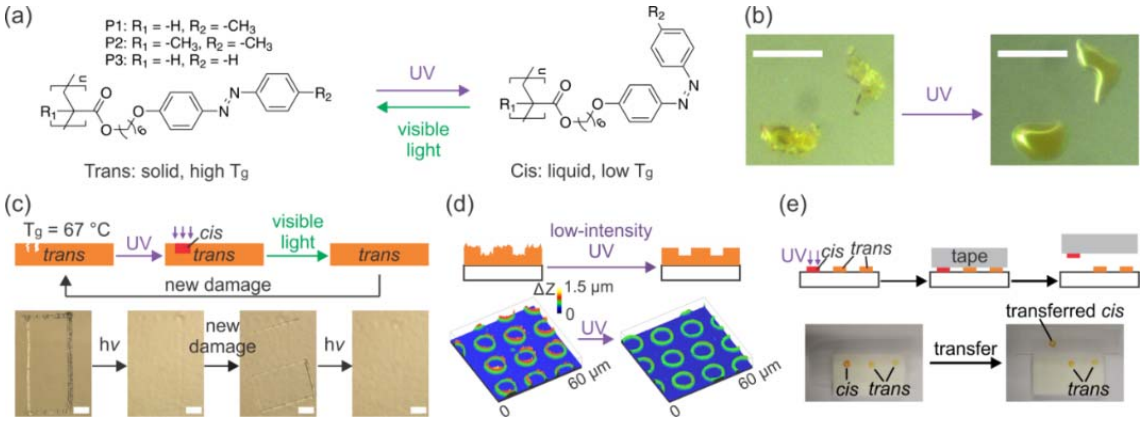


Figure 1. (a) Photoisomerization of azopolymers P1, P2, and P3. (b) Optical microscopy images of P1 powders before and after UV irradiation. (c) Schematic and optical microscopy images of healing of P1 with light. (d) Schematic and confocal microscopy images show photoinduced reduction of surface roughness. (e) Schematic and photographs of transfer printing based on the photoinduced solid-to-liquid transition.

[1] H. Zhou, C. Xue, P. Weis, Y. Suzuki, S. Huang, K. Koynov, G. K. Auernhammer, R. Berger, H.-J. Butt, S. Wu, Nature Chemistry 2017, 9, 145.

[2] W.-C. Xu, S. Sun, S. Wu, Angew. Chem. Int. Ed. 2019, 58, 9712.

[3] M. Chen, B. Yao, M. Kappl, S. Liu, J. Yuan, R. Berger, F. Zhang, H.-J. Butt, Y. Liu, S. Wu, Adv. Funct. Mater. 2020, 30, 1906752.