

Institute of Chemical Engineering

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Photomechanical effect in “side-chain” polyimides with low content of azopyridine chromophore

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The paper presents the photomechanical effect generated in new azo side-chain polyimides synthesized through a post-functionalization strategy involving the Mitsunobu reaction. Prepared azo polyimide foils were irradiated by a 405 nm diode-laser beam (intensity, $I = 100 \text{ mW/cm}^2$; polarization, $E||x$) for the generation of the photomechanical effect. Despite the low content of azo chromophore (substitution of the hydroxyl group was in the range of 7–35%) and thick cantilevers (thickness $\sim 35 \mu\text{m}$), bending angles were in the range of 30–40°. Thermal unbending was not observed for 12 months after turning off the excitation light. Our investigation showed that, despite the low content of azo chromophore, it is possible to achieve photodeformation under polarized light. To the best of our knowledge, this is the first example of the photomechanical response of azo pyridine polymers.

Metryczka

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