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Optically driven translational and rotational motions of micro-rod particles in a nematic liquid crystal RALF STANNARIUS, ALEXEY EREMIN, HAJNALKA NADASI, HIDEO TAKEZOE, Otto von Guericke University, Magdeburg, PEMIKA HIRANKITTIWONG, NATTAPORN CHATTHAM, Kasetsart University, Bangkok, OSAMU HABA, KOICHIRO YONETAKE, Yamagata University, Yonezawa — Liquid crystals are self-organized mesomorphic materials with various symmetries and structures. Their unique features can be exploited for smart multifunctional materials. Colloidal dispersions of micro- and nano-particles in LCs have been widely studied. We demonstrate controlled light-driven translational and rotational motions of micro-rods in a nematic matrix. A small amount of azo-dendrimer molecules dissolved in a liquid crystal drives translation and rotation under non-polarized UV light irradiation. This is initiated by a light-induced trans-to-cis conformational change of the dendrimer adsorbed at the rod surface and the associated director reorientation. This system represents an optically driven molecular microactuator, which exploits molecular reorientation on a particle surface and transforms it into a mechanical torque.

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