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Manipulation of Nano-/Micro Particles Using Light-Actuated Marangoni Tweezers CUNJING LU, Center of Smart Interfaces, TU Darmstadt, SUBRAMANYAN VARANAKKOTTU, Department of Chemistry, Ecole Normale Superieure, STEFFEN HARDT, Center of Smart Interfaces, TU Darmstadt, NANO- AND MICROFLUIDICS, CENTER OF SMART INTERFACES, TU DARMSTADT TEAM — The ability to manipulate and produce patterns of nano-/micro objects has been of great interest from both a fundamental and an application point of view. Here we demonstrate particle patterning using an optical landscape and optical nanoparticle manipulation based on light-actuated Marangoni tweezers. A liquid film with a photosurfactant which exists in two isomeric states (*cis* and *trans*) is employed for that purpose. Under multiple laser spots created by diffractive optical elements from a He-Cd laser, *cis*-rich regions with higher surface tension than unexposed *trans*-rich regions are created, resulting in converging Marangoni flows directing particles attached to the liquid surface toward the irradiated area. 10 μm polystyrene particles and 600 nm λ-DNA molecules distributed over the liquid surface move to the nearest laser spot and can be arranged in specific patterns. Furthermore, 100 nm polystyrene particles and 20 nm quantum dots can also be trapped, and the 100 nm particles can be driven along quite complex trajectories. Compared to conventional optical tweezers, the corresponding power requirements are much lower.

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