

Abstract Submitted
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Reversible structuring of azobenzene polymer films by surface plasmons¹ TOBIAS KOENIG, SVETLANA SANTER, University of Freiburg — It should be possible to move adsorbed nano-objects with relative ease, in large number and simultaneously. The essential idea is not to put more effort in fighting against the prevailing surface forces but rather to utilize them - in clear contrast to current techniques of nano-manipulation with atomic force microscopy [Santer, Adv Mat 2006]. For this, the topography should be reversible switching between different states by changing the morphology at the scale of objects to be moved. In this work, we choose light for changing the polymer topography. Here we present azo thin films [Seki, Chem Soc Jpn 2007] with integrated optically active elements supposed to support and steer the response of polymer films to external illumination by acting as nano-scale antennas. During irradiation surface plasmon (SP) waves are generated on a metallic mask. The interaction of the SP waves with azo polymers results in printing of near field intensity distributions into topography with the pattern size below the diffraction limit. We found that the topography can be driven reversible by changing polarization or wavelength. We also examine how the structuring process depends on the size of the metallic patterns. The results are confirmed by FDTD simulations and compared with imprints of photolithographic mask.

¹DFG and FRIAS

Tobias Koenig
University of Freiburg IMTEK

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