Mastering Nano-Objects with Photoswitchable Molecules for Nanotechnology Applications

Titre	Mastering Nano-Objects with Photoswitchable Molecules for Nanotechnology Applications
Type de publication	Chapitre
Type	Ouvrage scientifique
Année	2015
Langue	Anglais
Pagination	159-179
Numéro du chapitre	7
Titre de l'ouvrage	Organic Nanophotonics: Fundamentals and Applications
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Editeur scientifique	Zhao, Yong Sheng [5]
Pays	Allemagne
Editeur	Springer
Ville	Heidelberg
ISBN	978-3-662-45081-9
Résumé en anglais	Advance in the fabrication of nano-objects becomes more important for the development of new nanodevices with local properties leading to new functional devices. In this direction, the assembly of nanometer-scaled building objects into device configurations and functionalization is a promising investigated research field in nanotechnology. Optical recording and photofabrication techniques that exploit changes in material properties have gained importance, and there is a requirement for a decrease of the dimensions of the recording and processing surfaces. Photochromic materials leading to submicron structures responding to stimuli and in particular light are the best materials that exhibit multifunctional behaviors. Photomechanical properties of azopolymers show the perfect performance in photoinduced nanopatterning and reshaping by tailored light fields. Azopolymer nanostructures are then recognized as an excellent choice for a broad range of fundamental and applied research in modern nanotechnology. This chapter shows how polymer nanofilms, nanotubes, nanospheres, or nanowires containing azobenzene can be controlled by light for new photonics applications. Spatially confined excitation of unidirectional motions could make possible the local control of mechanical properties of the material and its structuration. The unprecedented flexibility of the reported photofluidization lithography with this material allows producing well-defined structures as lines, ellipsoids, rectangles, and circles at azopolymer surface with several tenth nanometers structural features.
URL de la notice	http://okina.univ-angers.fr/publications/ua12693 [6]

DOI	10.1007/978-3-662-45082-6_7 [7]
Collection	Nano-Optics and Nanophotonics
Lien vers le document	http://dx.doi.org/10.1007/978-3-662-45082-6_7 [7]

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