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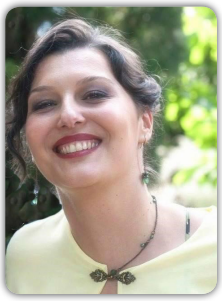

Parmeggiani C

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Light-fueled microrobots: The winning combination of liquid crystalline elastomers and photolithography

The ability to control the shape of micrometric objects by means of light is an appealing opportunity to develop robotic devices on such length scale. In this field, we recently demonstrated how it is possible to fabricate Liquid Crystalline Elastomeric microstructures with nanometric resolution and to control their shape by light irradiation. LCEs, materials well known as artificial muscles, are able to perform different reversible deformations due to a liquid crystalline alignment variation in response to an external stimulus. Among the different synthetic strategies, photopolymerization of acrylate based mesogens enables to structure this material on the microscale by the use of Direct Laser Writing (DLW). This methodology has been applied to develop the first example of light driven microrobots: a two-step procedure allowed to fabricate a microwalker able to walk, crawl and jump under light irradiation or a microgripper able to catch a microparticle. This communication will show comprehensively our results, focusing on the design of liquid crystalline photoresists suitable for DLW and their patterning in the microscale, demonstrating how, starting from simple mesogenic monomers, it is possible to create polymeric microrobots with different abilities.

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Speaker Biography

Parmeggiani C has completed her PhD in Chemical Science at the age of 29 years from University of Florence with Prof. A. Goti and she was recently awarded as researcher at the Chemistry Department of the University of Florence. Since 2010 she is associate at the European Laboratory for Non Linear- Spectroscopy and at the National Institute of Optics (CNR). In 2016 she was awarded with the "Organic Chemistry for environment, energy and nanosciences" prize from the Organic Chemistry Division of the SCI and she was a finalists of the European Young Chemist Award. She authored 37 papers, 1 book and 3 patents (h-index 16), on smart materials, stereoselective synthesis of iminosugars and new green oxidation methods that have been cited over 1150 times.

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