

Nanopatterning and electrospinning technologies for organic materials and polymer nanofibers

D. Pisignano^{1,2}

¹*ECMT, Istituto Nanoscienze-CNR, via Arnesano, I-73100 Lecce (Italy)*

²*Dipartimento di Matematica e Fisica “Ennio De Giorgi”, Università del Salento, via Arnesano 73100 Lecce (Italy)*

Active nanopatterns involving organic materials or nanoparticles [1,2] as well as electrospun polymer nanofibers [3,4] are appealing building blocks for a variety of scientific fields, such as optoelectronics, photonics, nanoelectronics, and microelectromechanical systems. In particular, electrospinning technologies can be easily up-scaled to industrial level. Demonstrated devices and applications include various sub-wavelength optical components and nanofiber lasers [6-7], pressure-sensors, accelerometers and wearables made of piezoelectric polymer nanofibers [8, 9]. Next-generation electrospun nanosystems are being developed, which couple opto-mechanical properties through proper molecular components [10]. Here nanopatterning and electrospinning methods developed in our group will be presented as well as recent results on active organic nanofibers. Investigated properties include light-confinement, optical losses, stimulated emission, and anisotropy [11,12]. The research leading to these results has received funding from the European Research Council under the European Union’s Seventh Framework Programme (FP/2007-2013)/ERC Grant Agreement n. 306357 (ERC Starting Grant “NANO-JETS”, www.nanojets.eu).

References

- [1] A. Camposeo et al., J. Mysliwiec, D. Pisignano, *ACS Nano* **8**, 10893 (2014).
- [2] A. Camposeo et al., D. Pisignano, Y. Xia, *ACS Nano* **9**, 10047 (2015).
- [3] L. Persano, A. Camposeo, D. Pisignano, *Prog. Polym. Sci.* **43**, 48 (2015).
- [4] D. Pisignano, *Polymer Nanofibers*, Royal Society of Chemistry (2013).
- [5] G. Morello, et al., D. Pisignano, *ACS Appl. Mater. Interf.* **7**, 5213 (2015).
- [6] V. Fasano et al., D. Pisignano, *Macromolecules* **46**, 5935 (2013).
- [7] D. Di Camillo et al., D. Pisignano, *Nanoscale* **5**, 11637 (2013).
- [8] L. Persano et al., D. Pisignano, Y. Huang, J. A. Rogers, *Nature Commun.* **4**, 1633 (2013).
- [9] L. Persano et al., D. Pisignano, *Adv. Mater.* **26**, 7574 (2014).
- [10] V. Fasano et al., A. Credi, D. Pisignano, *J. Am. Chem. Soc.* **136**, 14245 (2014).
- [11] A. Camposeo et al., E. Zussman, D. Pisignano, *Macromolecules* **47**, 4704 (2014).
- [12] A. Camposeo et al., E. Zussman, D. Pisignano, *Nano Letters* **13**, 5056 (2013).