

# NANOTEXTURING OF POLYMERS BY COLD PLASMA: SWITCHING FROM STICKY TO SLIPPERY SUPER-HYDROPHOBICITY

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It is a general trend nowadays, and it is also a useful approach for many important industrial applications, to tailor polymers to the desired chemistry or nano-morphology. The combination of both, chemistry and morphology, is a surplus value. Particularly if it is possible to tune each feature independently of the other.

At the CNR-IMIP and in collaboration with the University of Bari we have recently developed several approaches for tuning the nano-structure and chemistry of polymer surfaces by cold plasmas. In this conference we will deal only with single step nano-structuring plasma-processes with three different approaches:

- pulsed deposition discharges;
- afterglow deposition processes;
- “plasma roughening” processes of conventional polymers.

The nano-structured materials which are obtained have unique structures, feature super-hydrophobicity, can be easily modified in the surface chemistries, and open the domains of several applications, from *e.g.* de-icing and micro-fluidic devices to tissue engineering. As an example, the combined etching/treatment of polystyrene lead to a nanostructured fluorinated polymer where, by increasing the height and decreasing the density of the structures formed, there is a transition from a sticky super-hydrophobic to a slippery super-hydrophobic behavior.