Superhydrophobic/superoleophobic surfaces by electrodeposition of fluorinated conductive polymers: an overview of recent advances

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SUPERHYDROPHOBIC/SUPEROLEOPHOBIC SURFACES BY ELECTRODEPOSITION OF FLUORINATED CONDUCTIVE POLYMERS: AN OVERVIEW OF RECENT ADVANCES

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Obtaining super-phobic surfaces for liquid dewetting, water and oil for example, are of both theoretical and practical interest, as has been reported in recent reviews. On the one hand, the wettability of rough solid surfaces is governed by their roughness / morphology at the nano/micro scale and their low surface energy materials presented at the extreme surface. On the other hand, the spreading ability of liquids is governed by their surface tension. Hence, the control of surface morphology and wettability using liquid probes of various surface tensions is crucial in the development of non-wetting surfaces.

Here, I will present the new advances obtained by our group in the development of superhydrophobic and superoleophobic surfaces by electrodeposition of conductive polymers bearing fluorinated chains [1-4]. This technique is very versatile to produce non-wetting surfaces. Indeed, the surface morphology and as a consequence the surface wettability can be controlled by not only electrochemical parameters but also by tuning the chemical structure of monomers (Fig. 1 shows an example of exceptional example of surface morphology control, from thin fibrils to extremely long fibers, by replacing oxygen atoms by sulfur ones) [1].

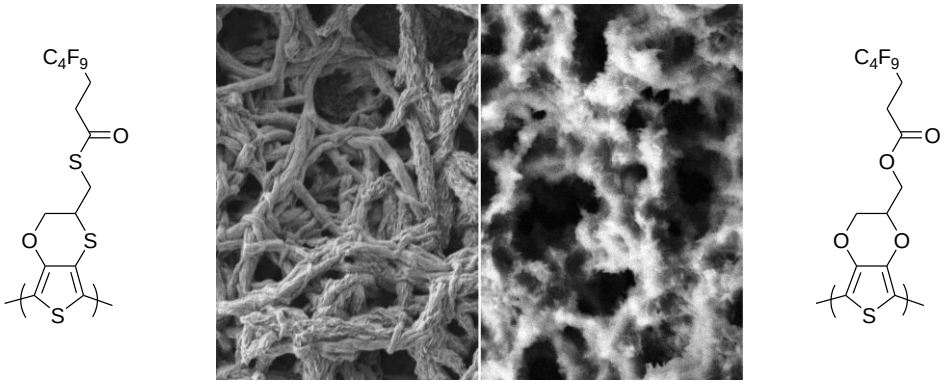

Fig. 1 Surface morphology comparison between two electrodeposited polymers, differing by the substitution of oxygen atoms by sulfur ones, using the same electrochemical conditions.

References

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