# Bio-functional surfaces of fluoropolymers via lithography techniques

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The immobilization of biomolecules at well-defined positions on a substrate is critical for several biological applications, like the detection of biomolecules, the development of microarrays and biosensors. Also, the developed structures can control the size and the structure of cells, which are attached on these. Moreover, the chemistry and topography of the substrate are crucial, affecting the cells behavior [1].

Optical lithography and electron beam lithography techniques are the most suitable methods for the creation of well-defined structures using, however, solvents that are not bio-compatible. To this end, the use of suitable photolithographic materials that can be developed with biomolecule friendly solvents (hydrofluoroethers) can overcome the obstacle of the optical lithography's strong solvents [2].

In this work, fluorinated homopolymers and copolymers were synthesized by free radical polymerization and they were evaluated as potential lithographic materials. The goal is to define materials whose hydrophilicity change upon exposure to UV radiation, thus facilitating immobilization of biomolecules on exposed areas. The surface characterization of the fluorinated homopolymers and copolymers in terms of solubility changes before and after exposure to UV radiation and the wettability of surfaces before and after exposure to UV radiation has taken place.

The novelty of this research work is the surface modification and more specific the surface hydrophilicity change in specific areas of a substrate using the optical lithography technique, in order to be used in biological applications.

References:

1. R.S. Kane et al., *Biomaterials* **20**, 2363-2376 (1999)
2. K. M. Midthun et al., *Biomacromolecules* **14**, 993-1002 (2013)

Acknowledgements

This research is co-financed by Greece and the European Union (European Social Fund-ESF) through the Operational Programme "Human Resources Development, Education and Lifelong Learning 2014-2020" in the context of the project "Bio-functional surfaces of fluoropolymers via lithography techniques" (MIS: 5048147).