

BASIC INFORMATION ON SUB-PROJECT

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| NAME OF PROGRAMME/FUND | Scholarship Fund - Sciex NMS ^{ch} |
| RESEARCH FIELD AND OTHER RESEARCH FIELDS INVOLVED (if applicable) | Chemistry, Physics, Engineering Sciences |
| TITLE OF THE SUB-PROJECT | Plasma Modification of Electrospun Polymer Micro and Nano Fibers (PlasmaESP) |
| REGION OF THE CZECH REPUBLIC (according to the location of the home institution) | South Moravian Region |
| GRANT AMOUNT SPENT | 35 269,00 CHF |
| INTERMEDIATE BODY | Swissuniversities |
| HOME INSTITUTION | Masaryk University Faculty of Science |
| HOST INSTITUTION | Empa Materials meet Life |
| NAME OF THE FELLOW | Eva Kedroňová |

ABSTRACT OF THE SUB-PROJECT

Flexible substrates made of micro and nano fibers with high surface areas find practical applications as membranes, filtration materials, and scaffolds for tissue engineering. They can be prepared at relatively low costs and high production rate by electrospinning but their utilization often requires a further surface treatment. The goal of the proposed project is to modify electrospun polymer micro and nano fibers by plasma technologies in order to achieve additional functionality of nanocomposite polymer materials. The main aim is to investigate modifications of fibrous PVA (polyvinyl alcohol) materials with respect to changes of wettability, while maintaining structural and mechanical properties. The modifications will be studied not only at the surface, but the experiments will be designed to investigate the penetration depth of plasma modifications that can significantly differ depending on the structure of the electrospun polymer and the conditions of plasma treatment. A (super) hydrophobic plasma coating with good penetration in the fibrous material will act as barrier against water, whereas a vertical gradient (superhydrophobic outside turning into hydrophilic inside) can exhibit adaptive properties. Stretching of the substrate or increased water pressure enables the contact with inside lying hydrophilic surfaces, thus switching a membrane from superhydrophilic to completely wettable case due to capillary forces. The proposed project combines complementary expertise and equipment of two research groups, the group at Empa in St.Gallen and the group at Masaryk University in Brno.

MAIN RESULTS

DATE OF REALISATION OF THE FELLOWSHIP

1.9.2012 - 28.2.2013

MORE INFORMATION ON THE PROGRAMME

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