Science and Engineering Research Program
Project Description

Leibniz Universität Hannover

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Institute: Institute of Multiphase Processes

Project title: Surface characterization of superhydrophobic SLIPS-Coatings

Project description: Interactions on the surface of implants are a focus of the activities of the Interfacial Engineering group at the Institute of Multiphase Processes. The interface between the organism and the implant poses a variety of challenges in application. In particular, the sliding properties play an important role. These have a considerable influence on the insertion forces during the implantation of cochlear implants, for example, but also on the tendency of unwanted scar tissue growth. Superhydrophobic Liquid Infused Porous Surfaces (SLIPS) were first described in 2011 as a way to create surfaces to which adhesion is virtually impossible. They therefore represent a promising approach for functionalizing implant surfaces. To fabricate these surfaces, a highly porous substrate impregnated with a hydrophobic liquid is required. Such a substrate can be produced by the electrospinning process established at the IMP. Different polymers with different properties and effects on the performance of the SLIPS coating can be used. In addition, there are a variety of possible lubricants that can be used to achieve the SLIPS effect. The aim of this work is to investigate and compare different combinations of substrate and lubricant with respect to their surface properties in order to find an ideal combination of materials for coating surfaces in medical applications. The students in this project will be involved in the preparation of the coatings in all process steps as well as in the final characterization of the surface properties. In addition, a thorough evaluation and interpretation of the data will be performed.

Required skills: laboratory work, statistical analysis, literature research.

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