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Switchable and Adjustable Fluid Transport and Wetting Properties in Polypyrrol-Silicon and Ceramic-based Inverse Opal Structures

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Substrates with switchable or adjustable wetting properties are desirable for actuators, coatings, filters or biomedical applications. In this work we present a study of two different substrates. Firstly, the possibilities of an electrically conductive polymer, i.e., polypyrrol in combination with porous silicon are explored, where previous studies already showed how an electric field can influence the chemo-mechanical properties of the polymer [1, 2] and the Young contact angle [3]. Secondly, we analyze the wetting and fluid transport properties of an alumina inverse opal structure (Al2O3), which undergoes a spontaneous transition under ambient condition to a more hydrophobic state in time. This transition can be reversed by a low temperature heat treatment. While, a high-temperature heat treatment irreversibly change the porous network structure [4], the low-temperature treatment preserves the inverse opal original structure.

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Primary author: GALLARDO DOMÍNGUEZ, Laura (Hamburg University of Technology)

Co-Autoren: FURLAN, Kaline (Institute of Advanced Ceramics, Integrated Materials Processing Group, Hamburg University of Technology); BRINKER, Manuel (Institute of Materials Physics and Technology, Hamburg University of Technology); HUBER, Patrick (Center for Hybrid Nanostructures CHyN, Hamburg University; Institute of Materials Physics and Technology, Hamburg University of Technology)

Vortragende(r): GALLARDO DOMÍNGUEZ, Laura (Hamburg University of Technology)

Sitzung Einordnung: Short talks