

Abstract Submitted
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Optical Imaging of Water Condensation on Lubricant Impregnated Micropillar Arrays¹ TADASHI KAJIYA, FRANK SCHELLENBERGER, Max Planck Institute for Polymer Research, PERIKLIS PAPADOPOULOS, University of Ioannina, DORIS VOLLMER, HANS-JÜRGEN BUTT, Max Planck Institute for Polymer Research — We explored the condensation of water drops on a lubricant-impregnated surface, i.e., a micropillar patterned surface impregnated with a ionic liquid. Growing drops were imaged in 3D using a laser scanning confocal microscope equipped with a temperature and humidity control. On a lubricant-impregnated hydrophobic micropillar array, different stages of condensation can be discriminated: - Nucleation on a lubricant surface. - Regular alignment between micropillars and formation of a three-phase contact line on a bottom of the substrate. - Deformation and bridging by coalescence, leading to a detachment of the drops from the bottom substrate to pillars' top faces. However, on a lubricant-impregnated hydrophilic micropillar array, the condensed water covers the micropillars by dewetting the lubricant. As a result, the surface loses its slippery property. Our results provide fundamental concepts how these solid/liquid hybrid surfaces can be applied for facile removal of condensed water, as well as necessity of the appropriate surface treatment.

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Tadashi Kajiya
Max Planck Institute for Polymer Research

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