

Drops on Superhydrophobic and Slippery Surfaces: Space and Time Resolved Imaging by Laser Scanning Confocal Microscopy

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Research on coating is greatly motivated by the emerging need for surfaces with low fouling and biofouling properties, tunable transparency, good anti-icing and improved heat transfer behavior. Approaches to tackle these challenges include superhydrophobic [1,2] or even superamphiphobic [3] surfaces and slippery lubricant infused textured surfaces [4]. In both cases, a deposited drop shows low adhesion to the underlying substrate and rolls or slides off when tilting the surface by a few degrees. In case of superhydrophobic or superamphiphobic surfaces this is achieved by encapsulated air pockets reducing the effective drop-solid contact area, whereas in case of slippery surfaces the encapsulated air is replaced by a lubricant. Until recently, neither quantitative information on the shape of the drop on superhydrophobic or slippery surfaces exists, nor microscopic information on how a drop advances or recedes. In this lecture, I will discuss the possibilities of laser scanning confocal microscopy to monitor the shape of the meniscus and the morphology of the contact lines. As model system we investigated micropillar arrays and inverse opals. Pinning and depinning of the drop from single micropillars is monitored with microsecond resolution, providing first time- and space resolved information on how a drop advances and recedes on a hydrophobic textured surface.

References

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