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Microchannel slip flow structure near superhydrophobic surface YOSHIYASU ICHIKAWA, KEN YAMAMOTO, MASAHIRO MOTOSUKE, Tokyo University of Science — Superhydrophobic surface (SHS) is well known to generate slip flow by forming liquid–gas (L–G) interface which contributes the drag reduction effect. However, the flow structure itself including the deformation of the L–G interface and slip length at the surface is still in discussion. Therefore, it is considered that the acquisition of the deformation and velocity profile near-SHS flow is essential to evaluate the shear stress on the interface which is closely correlated to flow resistance. In this study, we measured the flow velocity near-SHS which has microgrooves and microribs located parallel to the water flow direction to reveal near-SHS flow structures by astigmatism particle tracking velocimetry (APTV) technique which can obtain three-dimensional and three-component velocity. This technique enables us to determine three-dimensional particle locations and their velocities simultaneously. From the measured velocity profile, both the deformed shape of L–G interface and the local slip length distribution around the interface was obtained. It was also found that the local slip length distribution becomes smaller than theoretical values. Moreover, we evaluated shear stress distribution on the SHS as well as the drag reduction effect of the SHS.

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