Bachelor thesis: Bioinspired laser texturing of tribological surfaces

Description:

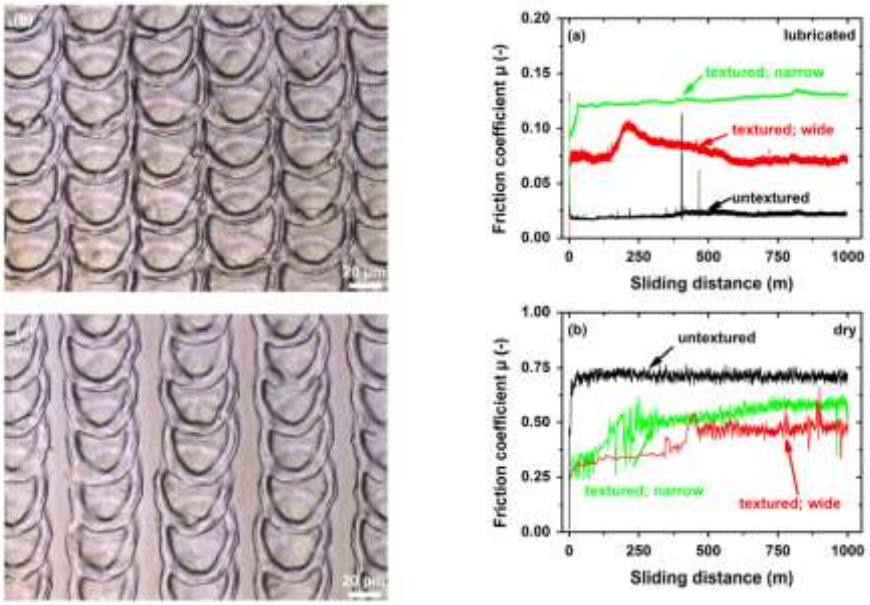
A major aim in tribology is the reduction of friction in parts that are subject to a sliding movement. In recent years bioinspired surface structures and their effect on tribology are being investigated [1, 2]. On the basis of bioinspired shapes and a form adapted to Bourots contour [3] for optimized drag in fluid dynamics and reduced stress i structural analysis the surface of tribological surfaces are to be structured by laser texturing.

Work program:

The goal of this bachelor thesis is hereby to imprint reproducible dimples with various contours on tribological surfaces by laser texturing. If the laser equipment is suitable and it is possible, it should also be tried to produce convex structures by lasering away the surrounding of the bioinspired shapes. The vertical and horizontal displacement between the individual Imprints or convexities as well as the depth of the imprints are to be varied. The results are to be proofed in suitable tribological tests under dry and lubricated conditions.

Support:

The Bachelor thesis is a collaborative work between IAM-ZM (Campus South) and IAM-MMI (Campus North). The work is mainly performed at the Campus South, where the experimental setup is located and similar investigations on bioinspired dimples have already been performed. From the technical side the thesis is supported by the IAM-ZM and from the administrative side by the IAM-MMI.



Images of bio-inspired surface morphologies created through laser surface texturing (left) and their effect on friction coefficient in lubricated and dry condition (right) from [2].

References:

[1] Braun, D.; Greiner, C.; Schneider, J.; Gumbsch, P. (2014) Efficiency of laser surface texturing in the reduction of friction under mixed lubrication, Tribology International, Volume 77, 142-147

[2] Greiner, C.; Schäfer, M. (2015) Bio-inspired scale-like surface textures and their tribological properties, Bioinspir. Biomim. 10, 044001

[3] Bourot, J.-M. (1974) On the numerical computation of optimum profile in stokes flow, Journal of Fluid Mechanics, Vol. 65, Issue 03, 513-515

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