



Morphology and regularity of high-spatial frequency laser-induced periodic surface structures (HSFL) on titanium materials

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Titanium and its alloys are known to enable the straightforward laser-based manufacturing of ordered surface nanostructures, so-called *high-spatial frequency laser-induced periodic surface structures* (HSFL). These structures exhibit sub-100 nm spatial periods – far below the optical diffraction limit. The resulting surface functionalities are usually enabled by both, topographic and chemical alterations of the nanostructured surfaces.

For exploring these effects, HSFL were processed on different titanium materials (bulk, film) upon irradiation with near-infrared ps-laser pulses (1030 nm wavelength, ≈1 ps pulse duration) under different laser scan processing conditions in normal air atmosphere. Here, we extend our previous work on chemical analyses of HSFL on titanium materials [1,2] towards a more detailed large-area morphological and topographical surface characterization. For this purpose, scanning electron or atomic force microscopic images are subjected to a regularity analysis using our *ReguLarity* software [3]. The results are assessed with respect to the influences of sample- or laser-related parameters on the regularity of the HSFL.

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References:

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