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Research document about fs surface

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FEMTOSURF Consortium

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3 Partner	FORTH	Greece
4 Partner	SUPSI	Switzerland
5 Partner	ROLLA	Switzerland
6 Partner	Aerea	Italy
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0.1	8/13/2020	Initial Draft	Linas Jonušauskas (Femtika)
0.3	8/20/2020	Final improvements	Gedvinas Nemickas (Femtika)
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Publishable summary

Deliverable 2.2 includes results and analysis of fabricate surfaces with Light Conversion femtosecond laser for FemtoSurf project as surface researching part. At this document are written and shown what laser parameters were used, also obtained results from researches and analysis or surface wettability and application surfaces investigation.

On research part of wettability, superhydrophilic and superhydrophobic surfaces were fabricated and tested by dropping distill water droplet on them. Superhydrophility were tested on aluminum surface by performing laser scans in one or two directions. At this point was observed water spreading on specifically produced surfaces, depending if surface was scanned only in one direction or in two directions. At superhydrophobicity part, variety of metals and them alloys were fabricated only by changing one or two laser parameters. Obtained results were compared between each metal alloy and with non-functionalized surface. On each metal and alloy, surface with superhydrophobical ability were produced.

For surface application part of deliverable, specific surfaces were produced. For anti-fouling application certain surface was chosen, also fabricated, to minimize contact area with water, theoretically maintaining hydrophobic abilities to prevent bacteria adhesion and send for further efficiency research. For friction manipulation application several theoretical surface textures were observed and then selected dimple for a friction reduction and diamond shaped texture to increase friction. Textures were fabricated on chrome alloy for further investigation how friction depends from surface texturing.

At osseointegration part, fabricated surfaces analysis were performed. Few surfaces were fabricated on titanium alloy by using femtosecond laser, only by changing one or two laser parameters. After fabrication, images of surfaces were made with scanning electron microscopy (SEM) for visual observation of the surface. Also profile pictures of each surfaces were made by using profilometer. Same samples were also analyzed with energy dispersive X-ray spectroscopy (EDS) for surface chemistry analysis. Each sample after analysis were chemically polished and similar analysis were performed. Non-polished and polished results were compared.

In conclusion analyzed experimental results of wettability surfaces, also for variety of applications are given in this document. Surface abilities dependency from texture type, used laser parameters, what surface type were selected for each ability and application.

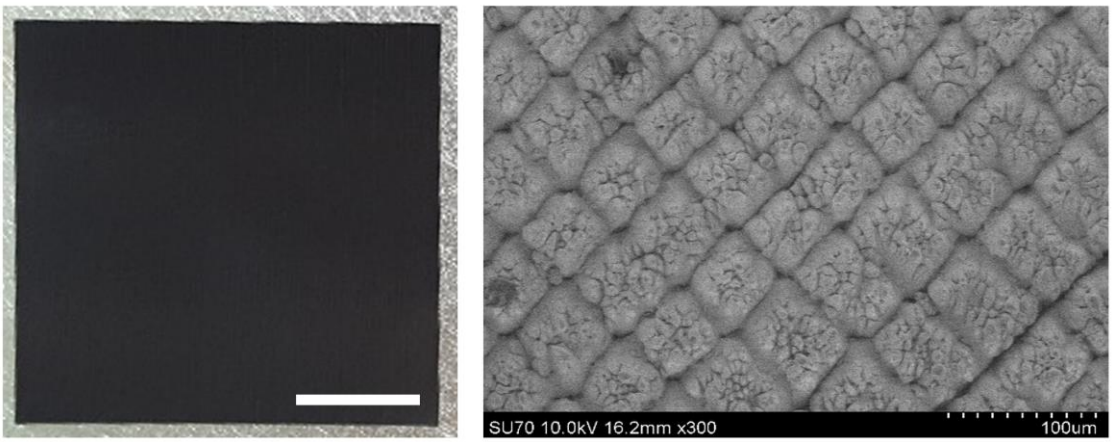

Figure 1. Sample for anti-fouling experimental.