

## Fabrication method for metallic parts with reduced friction

CSIC and FORTH have developed a method to fabricate metallic superoleophilic parts with improved lubrication. These metallic components feature laser-induced self-organized surface structures that act by increasing the wettability and distribution of a lubricant (oleophilicity) compared to a polished, unstructured metallic surface. Also, oil retention of up to 92% has been demonstrated after centrifuging the metal part at 3000 rpm for 120 min.

Industrial partners from the metal sector are being sought to collaborate through a patent licence agreement.

### *An offer for Patent Licensing*

**A combination of lubricant wettability, lubricant transport and lubricant retention capacity is achieved**

An increasingly used method to improve tribological properties of sliding friction loaded component is by structuring its surface. Commonly, the introduction of lubricating pockets into the running surface is required, which is carried out by means of picosecond or femtosecond laser processing.

The method developed by researchers of the CSIC and FORTH consists in the formation of a self-organized structure at the surface of a tribological part, without the need for special lubricating pockets. The surface structure is generated with a short or ultrashort pulsed laser beam. This surface structure acts through friction reduction via improving lubricant wettability, lubricant transport and lubricant retention capacity. Since little or no material removal is required the processing of the surface can be carried out faster.



The developed method is suitable to treat parts under friction like this metal shaft whose surface structure emulates some structures found in nature. The dark blue upper part of the shaft has been structured to ensure adequate lubricant wetting and transport.

### Main innovations and advantages

- No or minimal material removal is required to introduce lubricating pockets shortening production time of the metallic component.
- The surface structure has a better wettability with a lubricant compared to the polished metallic surface.
- The retention capacity of the surface for the lubricant and the lubricant transport velocity on the surface structure is significantly improved compared to the polished metallic surface.
- The better lubricant retention capacity and coverage makes it possible to ensure that the surface can be better protected against abrasion.
- Metallic parts of different materials can be produced: steels, titanium, aluminium, copper bronze and their alloys.
- These metallic parts are intended for applications as components of reciprocating engines, reciprocating pumps, gas compressors and pneumatic cylinders, among other similar mechanisms.

### Patent Status

PCT patent application filed.

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