Clean without scrubbing and using chemicals. Scientists develop self-cleaning aluminium surface

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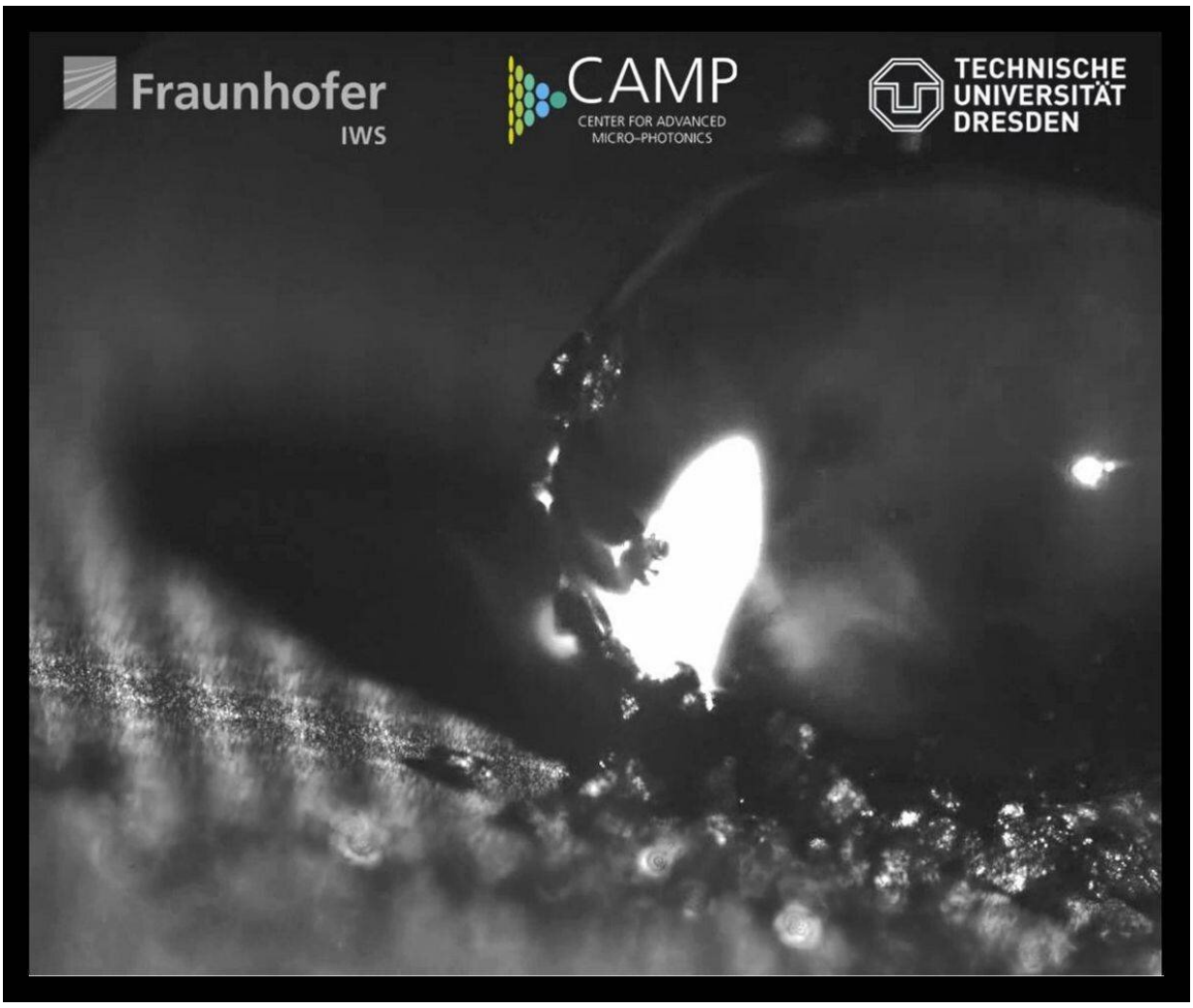


Water drops do not adhere to the self-cleaning aluminium surface. The latter has been functionalized by a team of CAMP scientists using direct laser interference

patterning (DLIP). Credit: Fraunhofer IWS Dresden

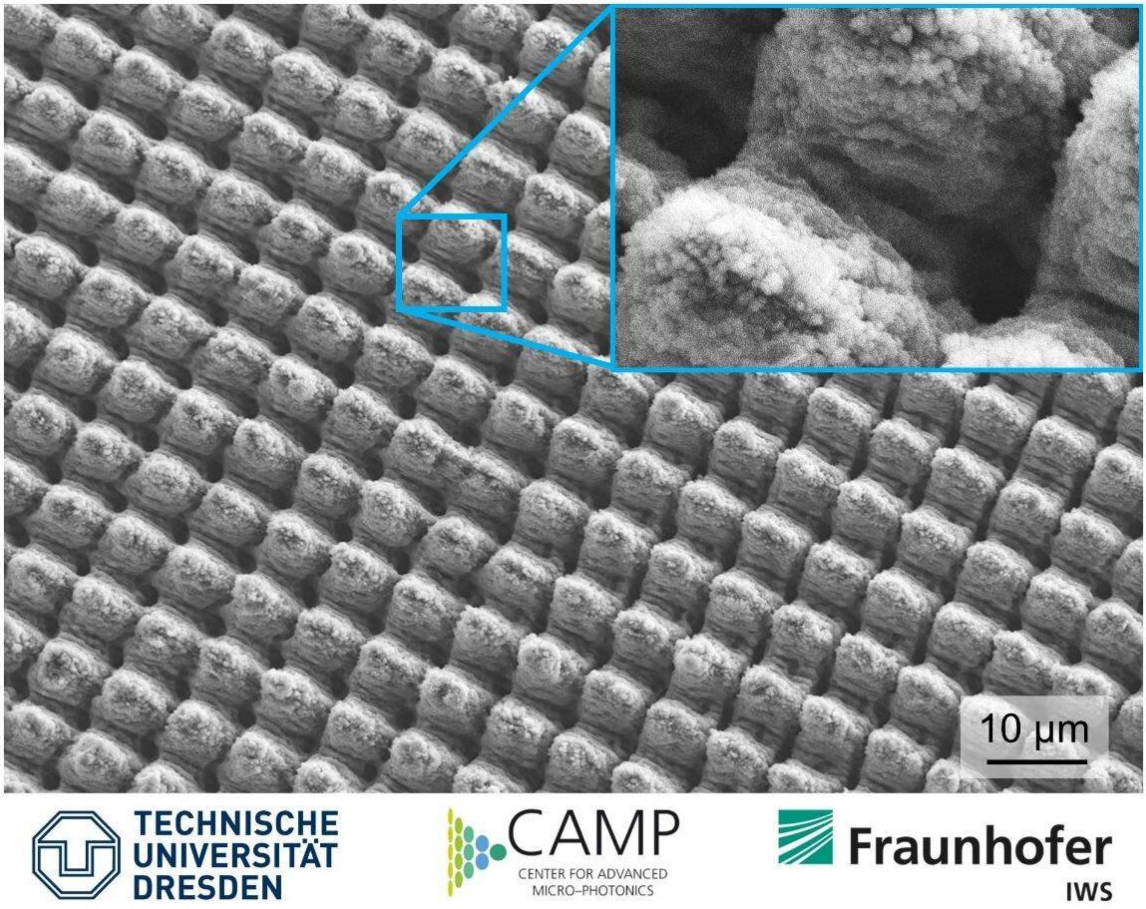
Dresden scientists have developed a self-cleaning metallic surface. A project team of Technische Universität Dresden and the Fraunhofer Institute for Material and Beam Technology IWS structured an aluminium plate with a laser process in such a way that water droplets no longer adhere and dirt particles can be removed from the surface—completely without chemical cleaning agents or additional effort. The scientific evidence of the self-cleaning effect has been published in the journal *Applied Surface Science*.

For several years, scientists at TU Dresden and Fraunhofer IWS have been developing functionalised surfaces by means of laser-based manufacturing processes. Now, they have created a periodic surface structure that is not only water and ice repellent, but also remove dirt particles solely by rolling water drops. In this context, they particularly focussed on the material aluminium.

"This material is used in many industrial branches—either in the automotive sector, aircraft construction or the food industry. The use of aggressive cleaning chemicals is particularly critical in food industry, as we naturally do not want to bring these chemicals in contact with our food," says Stephan Milles, Ph.D. student at Technische Universität Dresden. In particular, the Dresden scientists studied the function of self-cleaning laser-structured aluminium.

A special camera was used to analyse the self-cleaning effect of the aluminium surfaces and filmed the process at 12,500 frames per second. Thomas Kuntze, scientist in the Microtechnology Technology Field at Fraunhofer IWS, explains: "This way, we can perfectly see how a water drop can remove the dirt from the aluminium surface. This method is

also suitable for understanding other processes, such as laser cutting and welding or additive manufacturing."



Credit: Dresden University of Technology

More information: Stephan Milles et al. Characterization of self-cleaning properties on superhydrophobic aluminum surfaces fabricated by direct laser writing and direct laser interference patterning, *Applied*

Surface Science (2020). DOI: 10.1016/j.apsusc.2020.146518