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## Understanding the role of surface oxidation on wettability of laser textured surfaces

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► **To cite this version:**

Ilemona S Omeje, Tatiana Itina. Understanding the role of surface oxidation on wettability of laser textured surfaces. MANUTECH SLEIGHT SCIENCE EVENT#9, MANUTECH SLEIGHT GRADUATE SCHOOL, Jan 2023, SAINT ETIENNE, France. ujm-04249888

**HAL Id: ujm-04249888**

**<https://ujm.hal.science/ujm-04249888>**

Submitted on 19 Oct 2023

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**SPEAKER**

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**Title of the presentation**

Understanding the role of surface oxidation on wettability of laser textured surfaces

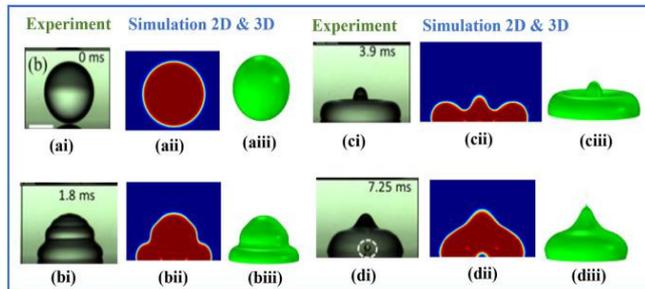
Project funded by Manutech SLEIGHT (Yes/No)      Yes

**ABSTRACT** / written in English (2000 characters spaces included max.)

In addition to controlling surface wettability, femtosecond laser surface texturing of materials by direct laser ablation has a wide range of applications, specifically for virus and bacterial repulsion. However, because of chemical surface alterations such as oxidation and/or molecule adsorption, the wettability of laser-textured surfaces alternates over time [1–2]. The reasons for this effect are not yet properly understood, despite their significance. To further understand these effects, we have developed a multiscale model, in which reactive molecular dynamics (RMD) is used to simulate chemical surface alterations while computational fluid dynamics (CFD) is used to quantify droplet behavior on laser-textured metal surfaces [3]. In particular, surface oxidation and molecule adsorption at the interface of a femtosecond laser were simulated using RMD. The obtained reaction rates are then utilized to modify a number of the CFD model's interface settings. The simulation's results demonstrate how the amount of surface-attached oxygen influences the evolution of water droplets.

**Co-authors + organisation/laboratory (affiliations):** Patrick GANSTER, Mines Saint- Etienne, Laboratoire Georges Friedel (LGF)

**Illustration** (1 sent in HD as an attachment)



Caption (+ indicate where it should be inserted):

Fig. 1. Comparison of experimental results with 2D and 3D simulation of water droplet on glass at 0, 1.8, 3.9 and 7.25 ms respectively.

The caption should be below the HD.

**Bibliography:**

- [1] Samanta, A., Wang, Q., Shaw, S. K., & Ding, H. (2020). *Materials & Design*, 192, 108744.
- [2] Bizi-Bandoki, P., Valette, S., Audouard, E., & Benayoun, S. (2013). *Applied Surface Science*, 273, 399-407.
- [3] Omeje, I. S., & Itina, T. E. (2022). *Applied Surface Science Advances*, 9, 100250.

**Keywords:**

Femtosecond Laser, Wettability, Reactive Molecular Dynamics (RMD), Oxidation.