Workshop »Coatings for Biomedical Applications«

Antibacterial coatings for surface hygienization

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Even before the corona pandemic, a large number of studies showed that surfaces play a significant role in the transmission of pathogens and infections. Depending on the surface and the environmental conditions, microorganisms and their pathogenic representatives survive on surfaces for hours, days, weeks or even up to several months. The situation becomes particularly critical when biofilm formation is involved, as this offers additional protection for the microorganisms against chemical and mechanical cleaning efforts. In hospitals and care facilities, contaminated surfaces of frequently touched or hard-to-reach objects can lead to severe infection outbreaks and long chains of infection. [1].

Antimicrobial coatings can be used to inactivate microorganisms on the surface or to initially prevent adhesion and thus biofilm formation. Superhydrophobic and superhydrophilic coatings, metallic coatings or dopants, embedded nanoparticles, as well as photocatalystically active materials can be used for this purpose. We have deposited coatings based on titanium dioxide, silver and/or copper by magnetron sputtering and evaluated their suitability as antimicrobial surface finish for various applications. An example is the titanium dioxide coating for siphons on washbasins, which has a bacteria-repellent effect due to its UVA activated superhydrophilicity (Fig. 1) [2].

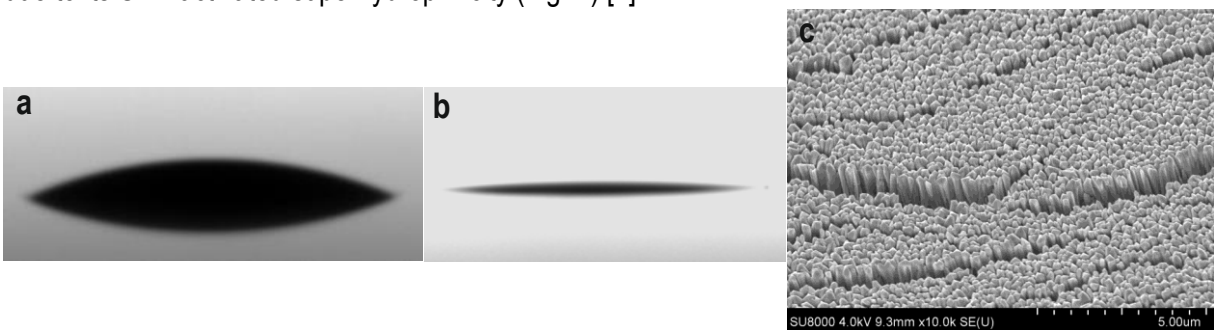

Fig. 1: Water contact angle on titanium dioxide before (a) and after (b) photocatalytic activation of superhydrophilicity by UVA irradiation and (c) SEM image of the coating structure.

References

[1] Mally, T.; Steinhäußer, L.; König, U.; Westerhoff, T.; EEDAL-LS-2022: International Conference on Energy Efficiency in Domestic & Light Sources (2022)
[2] Steinhäußer, L.; Gotzmann, G.; Fietzke, F.; Albrecht, J.M.; König, U.; Journal für Oberflächentechnik, 3: 34-36 (2022)