



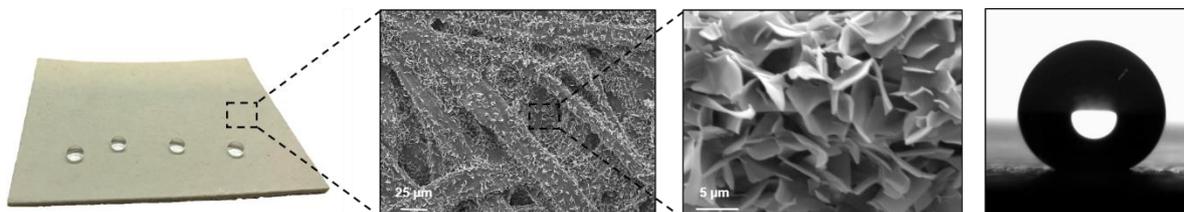
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## Water-repellent paper materials by superhydrophobic cellulose polymer based surface coating

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### Abstract

In this contribution, we present a novel strategy for paper coatings with superhydrophobic surface properties based on a micro- to nanoscale flower-like structure formation by a two-component wax-/ polymer coating. This surface structuring of the paper fibres occurs spontaneously when cooling down the coating from the molten state at moderate temperatures ( $T_m$ : 35-65 °C). The polymers used in the coating formulation are special designed hydrophobic cellulose polymers e.g. C18-esters of cellulose<sup>[1]</sup> or hydroxypropyl cellulose<sup>[2]</sup>. These polymers have been synthesised and intensively studied in our working group recently, showing auspicious surface properties. However, superhydrophobic properties are limited due to a change of coating structure from a particulate to a smooth film, for instance by thermal or mechanical impacts. Only the combination with low molecular waxes, as shown in this new contribution, possesses the unique capability of a spontaneously reversible restoring of such superhydrophobic properties by a simple reheating process.<sup>[3]</sup>



### References

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- 3 Geissler, A.; Biesalski, M.; Regenerierbare superhydrophobe Beschichtung, Patent WO 2018/193094 AI, **2018**.



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**KEYWORDS:**

Cellulose functionalisation

Bio-based paper coating

Superhydrophobicity

Water-repellent paper

Water-Proof paper

Sustainability

Cellulose-based coatings

**Biography**

Cynthia Cordt began studying chemistry at Technische Universität Darmstadt in 2010 focusing on polymer and paper chemistry. She wrote her bachelor thesis about superhydrophobic silica-polyurethane hybrid films in the working group of Prof. Matthias Rehahn in cooperation with the Fraunhofer Institute LBF dealing with. In 2017, she started working in the group of Prof. Markus Biesalski focusing on special paper properties. Initially, she wrote her master's thesis about long-term stable antimicrobial paper properties by designing antimicrobial cellulose acetate nanoparticles. Since November 2017, she continued her research as a PhD student dealing with the moisture protection of paper materials by biogenic coatings.

