



Extract from the Annual Report 2023
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From research

Biomimetic plasma polymers for the functionalization of paper

BioPlas4Paper

Paper is an integral part of our daily lives in so many ways, one example being the packaging industry. However, in order to fully exploit the potential of the material and to thereby replace, for example, conventional plastic packaging and open up new fields of application, the service life and performance of paper products must be increased. The major challenges here are presented by the temperature sensitivity of the paper, its surface irregularities and the chemical diversity of the material.

In order for homogeneous, functional and adhesive layers to be created on paper, meticulous coordination of the individual parameters is required. Within the framework of the BioPlas4Paper project, a novel plasma-source concept was developed with which a reproducible process environment can be created under atmospheric pressure that reduces the influence of ambient air to a minimum, therefore achieving homogeneous, reproducible coating results.

This innovative approach incorporates unused plant substances such as oils and extractive matter – without competition to food production – into the coating process and enables the hydrophobization of paper through the application of atmospheric-pressure plasma technology (PECVD, plasma-enhanced chemical vapor deposition).

Here, it is essential that the plant substances or extractives exhibit a high proportion of unsaturated fatty acids, as these are capable of polymerization processes in interaction with the reactive species of the plasma.

The added social value of the development lies in the promotion of sustainability and the bioeconomy through the efficient utilization of renewable raw materials, which leads to a CO₂-neutral, value-adding usage of paper.

The BioPlas4Paper project is therefore supporting the transition to a resource-efficient economy, is improving the ecological balance and, by striving for long-term security of supply with reduced dependence on fossil resources, is also addressing challenges such as resource scarcity.

The project

Biomimetic plasma polymers for the functionalization of paper

Duration

05/01/2021 - 06/30/2024

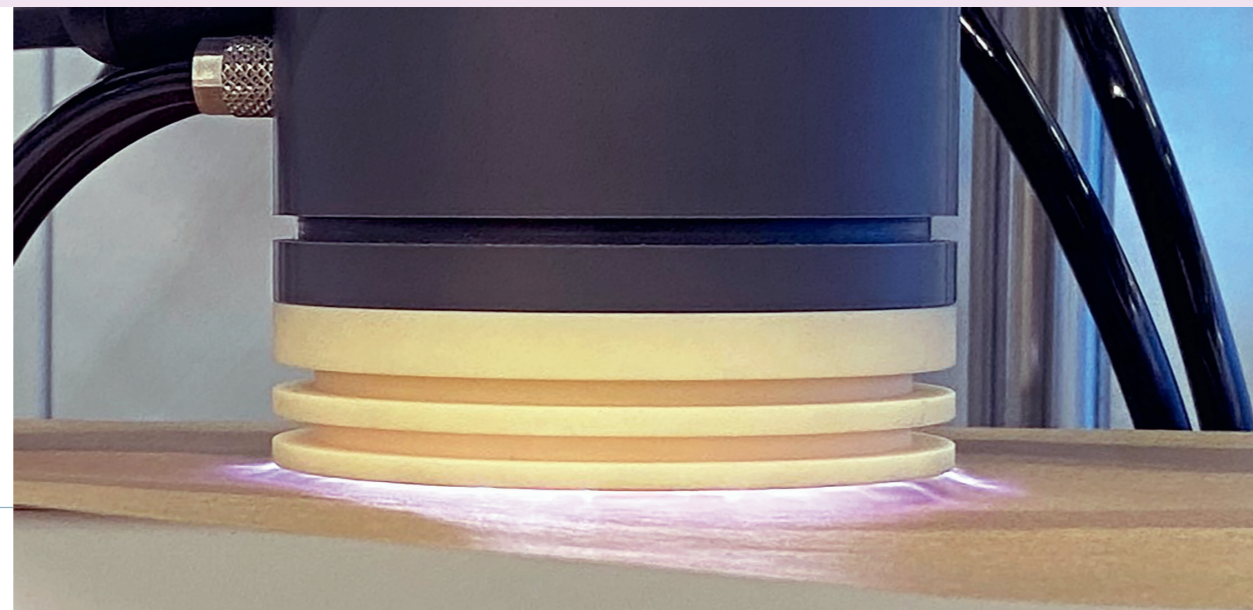
Project partners

- Technical University of Darmstadt, specialist department: Macromolecular Chemistry and Paper Chemistry
- Johann Heinrich von Thünen Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries

Funding bodies

- Ministry of Food and Agriculture
- Fachagentur Nachwachsende Rohstoffe (FNR)

Volume glide discharge on recycled paper.



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