

Extract from the Annual Report 2023  
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### #WeKnowSolutions

- Development of sustainable process chains with electro- and plasma-chemical processes
- Development of sources and their integration into customer systems
- Processes for the treatment and coating of complex three-dimensional components
- Characterization of interfaces and process evaluation
- Adhesion control for the optimization of recycling processes

## Interfacial chemistry and adaptive adhesion

# Innovations through optimized interfaces

### What are the focal points of the department?

In the Interfacial Chemistry and Adaptive Adhesion department, we develop customer solutions that range from the defined wetting of surfaces and the targeted control of adhesion to debonding-on-demand in recycling processes. The optimal design of the interface and the adaptation of the system technology is thereby a decisive success factor and our key to innovation. We utilize combination processes from plasma functionalization, wet-chemical processes and electroplating technology in order to be able to fulfill quality requirements and specifications from sectors such as medical and pharmaceutical technology, safety applications and mobility and, as a result, to develop sustainable products with efficient processes for our customers."

### What are the plans for the future?

The circular economy will play an increasingly prominent role in future projects. For example, we will be conducting more research into the development of sustainable surfaces and materials for applications in areas such as medical technology and mobility. Amongst other things, we are working on re-designing the interiors of patient rooms of the future or autonomous vehicles. We thereby want to address questions such as how dirt-repellent functions on the basis of PFAS-free materials (per- and polyfluoroalkyl substances) can be realized, which efficient and sustainable cleaning and preparation processes can be used that are simultaneously both efficient and sustainable, or which mechanical, chemical or biological recycling strategies are possible under the aspects of ecological and economic evaluation."

### What were the highlights in the reporting year?

The importance of interfaces can be seen in the department's current research projects. In the "COOLBat" project, we have developed new types of heat-conducting mats consisting of galvanically metallized porous polymers for battery systems in electric vehicles. For security cards, we researched an adhesive-free, low-temperature joining process for bio-based polymer films based on plasma polymer layers in the "BioElse" project. At the end of the card's life, the polymer films can be separated via a targeted trigger and then recycled. In collaboration with the Center of Pharmaceutical Engineering PVZ, we were able to develop coatings that significantly reduce the adhesion of particles to the surfaces of inhalers, for example."

*Selectively functionalized surface for the formation of "hanging drops" for 3D cell models.*

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