Fraunhofer FEP

PRESS RELEASE

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Sustainable surface technology as the key to resource conservation

Fraunhofer FEP uses multifunctional coating systems to demonstrate how sustainability can be implemented in surface technology. A prime example is the innovative MAXI system. It has been operating successfully for 25 years and proves that intelligent technology both conserves resources and enables versatile research and development tasks. In a tutorial at the V2025 conference, Fraunhofer FEP will provide a comprehensive overview of completed projects and future developments.

Sustainability in surface technology is becoming increasingly important in view of rising environmental requirements and scarce resources. Innovative coating processes make it possible to achieve both ecological and economic benefits. Surface technology contributes to sustainability on several levels. On the one hand, surface treatments extend the service life of products by providing corrosion protection, wear-reducing properties, and functional coatings. On the other hand, it is crucial to minimize the environmental impact of the coating processes themselves.

Fraunhofer FEP has extensive expertise in sustainable surface treatment, ranging from the development of environmentally friendly processes to the optimization of plant technologies. An outstanding example of sustainable plant technology is Fraunhofer FEP's MAXI plant. Commissioned in 2000, this inline vacuum coating plant for metal sheets and strips differs fundamentally from conventional plants in its multifunctional design. Whereas classic coating systems are usually designed for specific individual applications and often remain unused after the end of a project, the MAXI system is based on a modular, reconfigurable concept. The flexible system comprises eight chambers and enables the sequential execution of various process steps in both roll-to-roll and sheet-to-sheet processes. This versatility makes the system particularly sustainable: existing infrastructure such as pumps, pipes, and controls can be reused for new projects. This not only enables faster commissioning and cost advantages, but also significantly reduces waste and resource consumption. The initially higher acquisition costs of a multifunctional system are quickly amortized over several projects.

In recent years, the MAXI system has enabled a wide variety of applications: from corrosion protection and graphene coatings to the synthesis of powder-based materials and innovative applications in battery and solar cell production. This broad range of applications reflects the growing importance of multifunctional systems. "To meet the

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ever-changing challenges in research and development, multifunctional system solutions are indispensable. They enable us to respond sustainably to new industrial requirements while significantly reducing the ecological footprint of our processes," explains Dr. Stefan Saager from Fraunhofer FEP.

The modernization of the electronics and the integration of new plasma-assisted coating processes prepare the MAXI system for further decades of demanding research tasks. This continuity underscores the importance of sustainable plant concepts for the future of surface engineering.

To mark the 25th anniversary of MAXI, the advantages of multifunctional systems and their versatile applications will be presented as part of the tutorial "Sustainability in Surface Engineering" at the V2025 conference on October 13, 2025.

In-line vacuum coating system for sheets and metal strips "MAXI"

Picture in printable resolution: www.fep.fraunhofer.de/press

Fraunhofer FEP at the V2025 conference

Conference
October 13 – 16, 2025
International Congress Center Dresden

Tutorial "Sustainability in Surface Engineering"
October 13, 2025, 13:00 to 17:00
Fraunhofer FEP

Presentations

Sustainability in R&D: Design of Multifunctional Pilot Plants for Long-term Covering a Wide Range of Challenging Demands
S. Saager
Session: TUT - TUTORIAL »Sustainability in Surface Engineering«
October 13, 2025, 14:00
Location: Fraunhofer FEP (Tutorial)

Roll-to-roll Vacuum Coating Technologies: Silicon-based Next Generation Anodes for Lithium-Ion Batteries
C. Luber
Session: Session 1.1 - WORKSHOP »Surface Engineering for Energy Technologies«
October 15, 2025, 16:40
Location: Room 3

Thermochromism: Fabrication, Properties, and Applications of Sputtered VO_2 Films
C. Steiner
Session: Session 6 - WORKSHOP »Sustainablility & Flexible Substrates«
October 15, 2025, 16:10
Location: Room 5

Poster

Surface wettability modification of polymers for use in electrocaloric heat pumps
M. Barrera
October 14, 2025, 10:30
Location: Exhibition

Enhancing the Crystallization of Sputtered Titanium-Oxide-Films for Antipathogenic Surface Applications via Various Annealing Techniques
M. Ehrhardt
October 14, 2025, 10:30
Location: Exhibition

Roll-to-roll magnetron sputtering of alumina (Al_2O_3) onto plastic films for sustainable packaging
M. Hoffmann
October 14, 2025, 10:30
Location: Exhibition

Digitalization of magnetron sputter processes for deposition of piezoelectric thin films
S. Barth
October 14, 2025, 10:30
Location: Exhibition

Controlled Reactive Magnetron Sputter Epitaxy of GaN Using a Solid Ga Target
M. Ott
October 14, 2025, 10:30
Location: Exhibition

Advanced process control using double ring magnetron for polarity control in sputtered epitaxial AlN
V. Garbe
October 14, 2025, 10:30
Location: Exhibition

Adhesion enhanced decorative coatings on ETFE - Combination of Plasma and Nanoimprint Roll-to-Roll processes for BIPV
S. Günther
October 14, 2025, 10:30
Location: Exhibition

Improvement of the adhesion force of sputtered aluminum layers on polyethylene terephthalate films (PET) by surface modification using flash lamp annealing
T. Preußner
October 14, 2025, 10:30
Location: Exhibition

Optical Emission Spectroscopy during Anodic Arc Deposition of Dielectric Films
R. Werberger
October 14, 2025, 10:30
Location: Exhibition

Session Chairs

"Engineering for Energy Technologies"
Dr. Jörg Neidhardt
October 14 – 15, 2025

"Sustainability & Flexible Substrates"
Dr. Matthias Fahland
October 15, 2025