

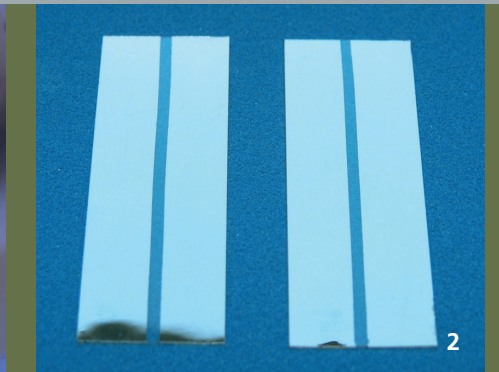


# Fraunhofer POLO

FRAUNHOFER POLYMER SURFACES ALLIANCE POLO®



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- 1 *OLED encapsulation with ultra-barrier film.*
- 2 *Metallized polyolefin films.*
- 3 *Cell culture dishes with antimicrobial films.*
- 4 *Packaging films with transparent barrier coatings.*
- 5 *Plasma coating of a PET bottle for reduced adhesion.*
- 6 *Surface coating by plasma treatment at atmospheric pressure.*

## FRAUNHOFER POLO®

### YOUR PARTNER AT THE SURFACE OF POLYMERS

#### Our Service

The Fraunhofer Polymer Surfaces Alliance POLO® is your one-stop-shop for new technologies and materials for the surface functionalization of polymers. We offer our extensive experience and know-how for developing new concepts, innovative processes, and modern materials based on the surfaces of polymers. Our services include:

- concept development
- feasibility studies
- development of processes and materials
- plant planning and design
- introduction of new processes and materials into production
- process monitoring and quality assurance
- troubleshooting
- analysis and testing

#### Your Benefit

Fraunhofer POLO® can help you to design and to produce new innovative products which will provide you with

- unique selling points
- high quality standards
- cutting-edge materials
- efficient processes
- competitive advantage
- reduced production costs

#### Our Products

The development activities of Fraunhofer POLO® focus on technologies and materials for the functionalization of surfaces, in particular polymer surfaces. By altering, enriching, modifying, and coating materials we create multifunctional surfaces and intelligent systems. The development and the application of energy-saving and sustainable processes enables our customers to assure the quality of products. Some examples are described below.

#### Fraunhofer Polymer Surfaces Alliance POLO®

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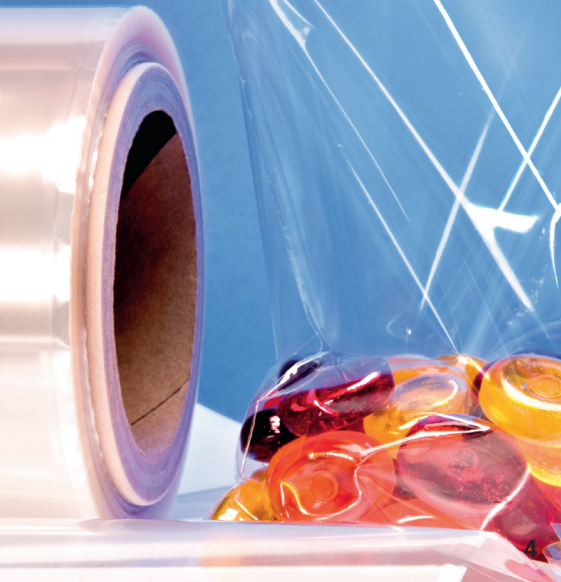
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### Cutting edge ultra-high barrier films

are available as roll material on pilot scale. The flexible, transparent, high and ultra-high barrier films developed by Fraunhofer POLO® belong to the best that are available on the market today. With extremely low gas permeability (water vapour transmission rate of  $5 \times 10^{-5} \text{ g}/(\text{m}^2 \text{ d})$  and below at ambient condition) they are suitable for the encapsulation of flexible and organic electronics (e.g. OLED and thin-film photovoltaics), for vacuum insulating panels and many other high-performance applications.

### Protection for sensitive surfaces

Scratch-resistant and abrasion-resistant coatings make displays and other touch-sensitive coatings suitable for daily life by protecting the sensitive surfaces. Fraunhofer POLO® is involved in the development of new applications for plastics, glasses, ceramics, metals, and electronic components.

### Quality assurance via intelligent layers

Indicators incorporated into packaging films allow, for example, the early detection of oxygen inside the package of products which are sensitive against the oxidative degradation or they can detect the spoilage of food. The indicator films developed by the Fraunhofer POLO® help to enhance product safety and to protect companies and customers.

### Clean and safe – antimicrobial layers

Making surfaces not only self-cleaning but also resistant to microorganisms and biofilm formation helps to set hygiene standards and avoid precarious “dirty corners” and contamination on and in buildings, technical plants, etc.

### Metallization of plastics

Fraunhofer POLO® develops technologies for improving the adhesion of metals to plastics which are compatible with PVD processes or alternatively with galvanic wet processing. Typical materials include ABS, ABS/PC, polyimide, and polyolefins.

### Counterfeit protection

The application of fluorescence dyes was found to be helpful as an aid for process control in thin film coating of lacquers in order to monitor the thickness and the curing state. Moreover, the unique spectral features which evolve from the interaction of the dye with the material can also serve as a label for materials to fight product piracy.

### Troubleshooting and analytical services

For our research and development work we use a wide range of analytical and testing techniques including surface and thin film analysis, materials analysis and testing, as well as permeation measurements and modelling. We offer most of these techniques as services to our customers.

### Expertise for customer's benefit

Fraunhofer FEP | Dr. John Fahlteich  
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vacuum deposition, scale-up of equipment

Fraunhofer IAP | Dr. Andreas Holländer  
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polymer science and processing, surface chemistry, plasma and wet processing

Fraunhofer IFAM | Dr. Uwe Lommatzsch  
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adhesive bonding, plasma deposition, pilot-scale coating

Fraunhofer IGB | Dr. Christian Oehr  
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plasma deposition, CVD, nanoparticles, biofunctional surfaces

Fraunhofer IPA | Dipl.-Ing. Dominik Nemeč  
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scale-up and automation, functional materials, dispersion techniques

Fraunhofer ISC | Dr. Sabine Amberg-Schwab  
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inorganic-organic hybrid polymers (ORMOCER®s)

Fraunhofer IVV | Dr. Klaus Noller  
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wet coating, lamination, permeation measurement and modeling

