PERMEATION BARRIERS

Enabling light and power from the roll
APPLICATIONS

Permeation barriers are vital for a range of applications. Fraunhofer FEP has an extensive experience in R&D and pilot manufacturing of high-quality barrier films for:

- flexible packaging
- smart packaging
- flexible organic electronics
- flexible photovoltaic devices
- electrochromic systems
- thin film energy harvesting and energy storage devices
- holographic systems on polymers
- sensors and flexible/organic transistors
- quantum dot and OLED displays
- wearables and other flexible electronic devices

OUR TECHNOLOGIES

For each application, we provide the best suitable technological approach taking into account technical requirements and economic targets. Our technologies include:

<table>
<thead>
<tr>
<th>Technology</th>
<th>Productivity (line speed) m/min</th>
<th>WVTR at 38°C/90% r.h. [g/(m² d)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>hollow-cathode plasma-assisted evaporation (HAD)</td>
<td>600</td>
<td>1</td>
</tr>
<tr>
<td>reactive sputtering of oxides</td>
<td>1</td>
<td>0.005</td>
</tr>
<tr>
<td>multi-layer stack: sputtering + wet coating of ORMOCER®</td>
<td>1</td>
<td>0.0002</td>
</tr>
<tr>
<td>multi-layer stack single pass: sputtering + arcPECVD</td>
<td>≥ 4</td>
<td>0.005</td>
</tr>
<tr>
<td>atomic layer deposition</td>
<td>static process</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

COATING EQUIPMENT

Fraunhofer FEP uses a set of roll-to-roll vacuum coating machines for laboratory and pilot production scale up to 650 mm web width.

Lab coater: labFlex® 200
- 220 mm web width
- sputtering and PECVD
- roll-to-roll OLED encapsulation without roller contact of coated side

Pilot coaters: coFlex® 600 and novoFlex® 600
- 650 mm web width (pilot scale)
- sputtering, PECVD and evaporation
- multilayer deposition in one run
- web speed up to 10 m/s
- double-side coating

OUR OFFER

Our services include contract R&D, joint development, technology transfer and licensing focusing on:

- evaluation of polymer substrates for barriers
- sampling, material provision and feasibility studies
- roll-to-roll pilot production of barrier film rolls
- adaption of barrier films to specific application
- functional film design and deposition
- product integration
- key components for barrier layer deposition
- direct thin film encapsulation of devices
- barrier film and device characterization
- roll-to-roll particle and defect inspection
- coulometric permeation measurement
OUR MISSION

With our key technologies your products are one step closer to the market. Don’t hesitate to contact us with your specific needs.

CONTACT

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