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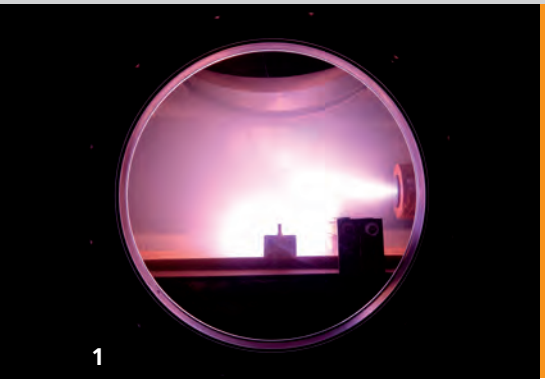

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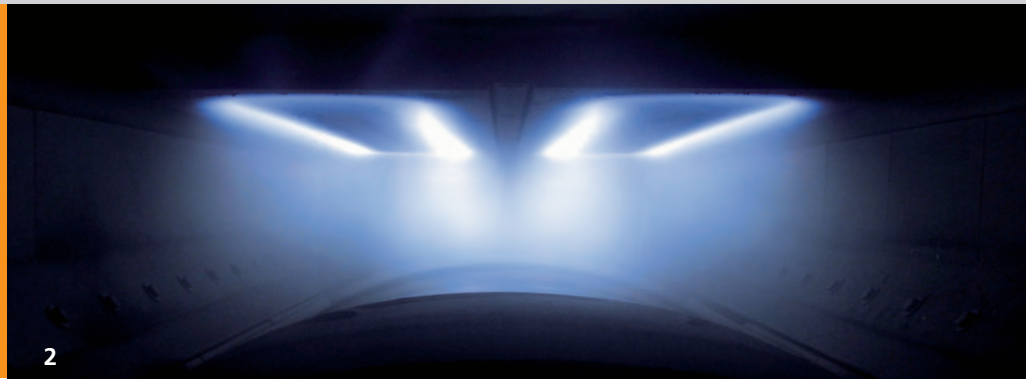

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1 *The arcPECVD process operating in the labFlex® 200*

2 *The dual magnetron plasma source used for the magPECVD process*

ULTRA HIGH-RATE PECVD FOR LARGE AREA APPLICATIONS

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Plasma Enhanced Chemical Vapor Deposition (PECVD) is a versatile technique that is widely used for the application of silica-like and organically modified plasma polymer coatings. Fraunhofer FEP introduces two ultra high-rate PECVD technologies based on magnetrons and hollow-cathode plasma sources. These technologies are very suited for large area deposition both in static and dynamic processes. The improved deposition rate in comparison to classical PECVD sources allows more efficient deposition processes and reduces the coating costs.

Magnetron (magPECVD) based and hollow cathode arc discharge (arcPECVD) based processes allow the deposition of tailored silicon-containing coatings for many applications including e. g. optical coating systems or mechanical protective coatings on ceramic PVD coatings. The wide adjustable range of deposition speeds makes these technologies perfectly suitable for in-line systems from high-quality PVD coatings up to high-rate evaporation technologies.

The Fraunhofer FEP gathered extensive experience with the magPECVD and arcPECVD processes both in roll-to-roll processes on e. g. polymer films or sheet-to-sheet processes on e. g. glass substrates. Both technologies are ready to be tested in a feasibility study at the Fraunhofer FEP pilot systems up to 600 mm web width and are ready to be scaled up at web widths larger than 2 m.

3

Process advantages

- Ultra high-rate deposition techniques
- Tunable deposition rate
- Low pressure technology (0.1 – 5 Pa)
- Suitable for in-line deposition with PVD technology
- Tailored coating properties (mechanical, chemical, optical)
- Organic modification of ceramic coatings
- Scalable to large-area coating systems

Application examples

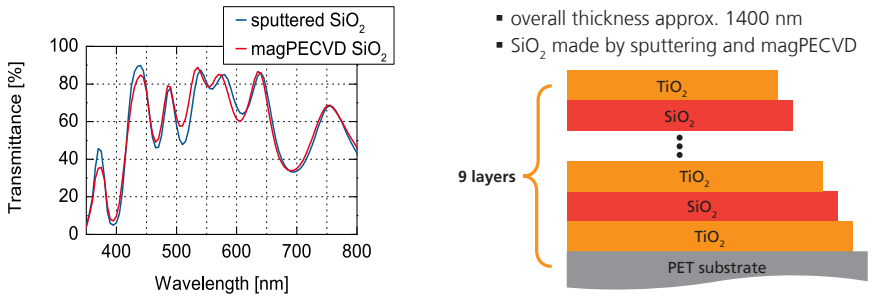
- Optical coatings
- Mechanical (winding) protection of ceramic and metallic coatings
- Surface modification layers
- Chemical buffer layers

What we provide

- Technical consulting services
- R&D services at our pilot equipment:
  - Roll-to-roll up to 220 mm at our lab coater *labFlex® 200*
  - Roll-to-roll up to 650 mm at our pilot coaters *coFlex® 600* and *novoFlex® 600*
  - Sheet-to-sheet up to 1200 mm × 600 mm at our pilot coater ILA 900
- Thin film characterization services
- Technology transfer towards customer site
- Technology licensing

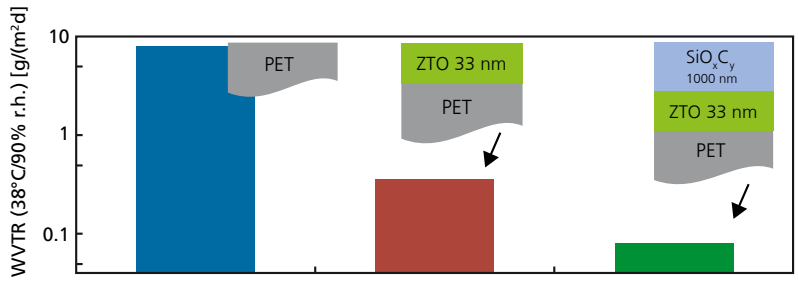
Technology	Dynamic deposition rate
Sputtering	< 100 nm·(m/min)
magPECVD	100 ... 500 nm·(m/min)
arcPECVD	200 ... 3000 nm·(m/min)

4 Dielectric solar control layer stacks



Replacement of SiO_2 sputtered coating with magPECVD deposited SiO_2. This allows for faster deposition and lower residual stress of the optical layer stack.

5 Winding protection of inorganic barrier coatings



In-line application of arcPECVD deposited plasma polymer coatings improves the robustness of inorganic barrier coatings and reduces the overall water vapor transmission rate.

3 Array of hollow cathodes for a total width of 2.45 m

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