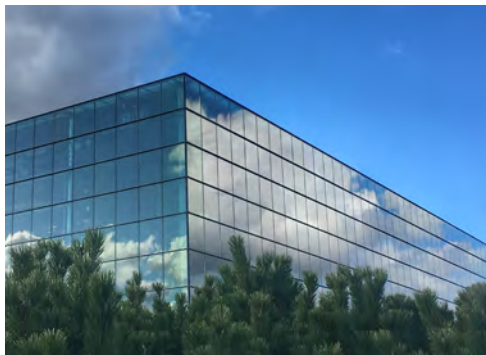




Coating of flat substrates



At Fraunhofer FEP we develop industry-oriented processes for applying layers and multilayer systems to large substrates made of glass and polymers. For this we use vacuum-based sputter technologies and high-rate PECVD. Thereby we specialized in pulse magnetron sputtering (PMS) and the control of reactive sputter processes.

We are continually advancing our technologies in order to adapt them to new applications and to optimize the costs for high-quality coatings.

The development of key components for PMS and process control is also offered by Fraunhofer FEP.

The layers and layer systems are used, for example, for architectural glass (low E-coatings/solar control coatings) and for transparent conductive electrodes in photovoltaic and electronic systems. They are also used for electromagnetic shielding and for antireflective (AR) and antireflective-antistatic (ARAS) coatings for displays.

Contact

Dr. Jörg Neidhardt
Phone +49 351 2586-280
joerg.neidhardt@fep.fraunhofer.de

Dr. Nicolas Schiller
Phone +49 351 2586-131
nicolas.schiller@fep.fraunhofer.de

Fraunhofer Institute for
Organic Electronics, Electron Beam
and Plasma Technology FEP

Winterbergstr. 28
01277 Dresden, Germany

www.fep.fraunhofer.de



Applications

- Optical functional layers:
 - antireflective (AR) / antireflective-antistatic (ARAS)
 - electromagnetic shielding for electronic devices
 - energy-efficient construction (low-E, solar control)
 - mirror layers (highly reflective mirrors, baroque mirror coatings, blue mirrors)
 - decorative layers
- Non-optical functional layers:
 - magnetic storage devices
 - anti-scratch layers on polymer surfaces
 - surface metallization
 - hard material layers

Our offer

- Process development and feasibility studies for new single layers or layer systems having specific electrical, optical, and mechanical properties
- Pilot production for the introduction of new products to the marketplace
- Development and testing of technological components and integrated packages for production plants
- Modernization and expansion of existing sputter plants

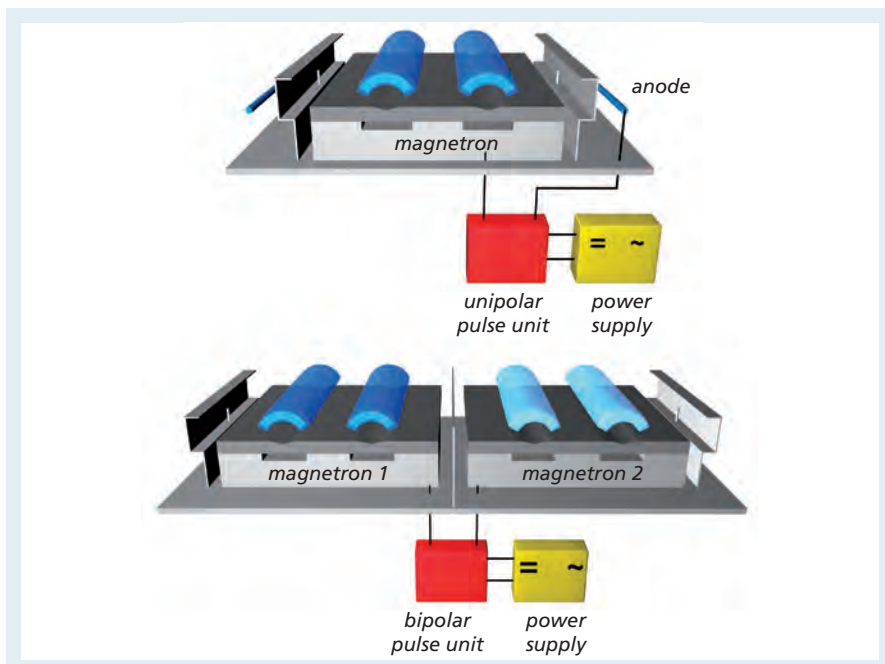
Technologies

Layers and layer systems are deposited in reactive mode from metallic targets or from ceramic targets by unipolar or bipolar magnetron sputtering from planar or cylindrical targets. A wide range of materials can be deposited:

Dielectric materials	Al_2O_3 , Cr_2O_5 , MgO , Nb_2O_5 , SiO_2 , Si_3N_4 , SnO_2 , Ta_2O_5 , TiO_2 , ZnO , ZrO_2
Transparent conductive oxides (TCOs)	ITO, IZO, ZnO based TCO, TiO_2 based TCO
Metals	Ag, Al, Cr, Cu, Mo, Sn, Ta, Ti, Zr

Typical dynamic deposition rates (DDR) for selected materials:

	DDR [nm × m/min]
SiO_2	80
TiO_2	40
TiN	22
Nb_2O_5	60
Al_2O_3	63
ITO	50
ZnO	50



Scheme of unipolar and bipolar pulse magnetron sputtering

- 1 Coated special spectacles
- 2 In-line coating plant ILA 900