

SURFACES COMPETENCE

in education, research and business

Surfaces are becoming increasingly diverse, multifunctional, intelligent, cost-effective, durable, and environmentally friendly. The optimisation of physical, chemical, optical and haptic properties, increases functionality and quality, among other things. At the Technopol Wiener Neustadt, a high concentration of competence in this field of technology has been created.

The figures speak for themselves:

- 7 research facilities
- 14 areas of expertise
- 108 employees



Foto: Astrid Bartl

The research institutes at the Technopol Wiener Neustadt have successfully put their expertise to use in the surfaces technology field in many applications. Some examples are presented on the following pages.



- Characterization and examination of coatings, varnish and adhesives

SURFACES



- Development of innovative electrochemical processes for customized functional high-tech coatings via puls and dispersion separation
- Prototyping of innovative galvanic layersystems for components with high-precision and performance

- Manufacturing of highly resilient light metal coatings via patented electrochemical coating processes
- Technical consulting as service in damage analysis, process optimization and projecting of industrial electroplating facilities

fotec

- Development and implementation of automated measuring and testing systems



- **Development and manufacturing** of functional surfaces by means of nano particles



- **Exploration** of wear mechanisms and development of wear prognosis models as well as manufacturing and analyzing of metalpowder based coatings with tribologically optimized characteristics



Technopol Wr. Neustadt
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· **Forschung**
· **Ausbildung**
· **Industrie**



- **Development and modification** of functional varnish and surface coatings for industrial applications
- **Development** of functional and sensory nano layers
- **Development and engineering** of reactors, pilot and small production systems for nano and varnish coatings and vacuum coating systems



- **Development** of functional coatings and coating processes for metallic and non-metallic surfaces and materials
- **Exploring** corrosion mechanisms and development of sophisticated solutions in corrosion protection
- **Providing** services in surface technology

Application example

Simulation of wear mechanisms



One of the core competencies of the AC²T lies in the experimental simulation of the wear mechanisms of applications on a laboratory scale. The aim is an understanding of the processes involved, which makes it possible to derive corrective measures and to develop wear-resistant materials and coatings. Examples:

- Evaluation of surface effects due to current passage through bearings
- Growth of cracks and fatigue mechanisms in wheel-rail contact
- Tribological optimisation of high temperature metal forming processes for the automobile industry

Exploration of wear mechanisms and development of wear prognosis models as well as manufacturing and analyzing of metalpowder based coatings with tribologically optimized characteristics

Application example

Anti-icing systems



One of the most critical risk factors in the airline industry is icing of aircraft parts. In a project coordinated by AAC, materials for surface coatings were developed that could prevent icing. In collaboration with project partners, wind tunnel tests were also performed, in which weather conditions that lead to icing can be simulated. Also for the de-icing of rotor blades for wind turbines, anti-icing systems can be applied; here, active and passive systems are developed and tested. An AAC system is currently in field trials at a large facility. ■

Development and manufacturing of functional surfaces by means of nano particles



Development and modification of functional varnish and surface coatings for industrial applications

Development of functional and sensory nano layers

Application example Coatings with special functions



Attophotonics is developing customised paints and coatings for indoor and outdoor applications and is carrying out plasma treatments and a range analyses and tests for the characterisation of coatings and surfaces. Some examples include:

- Anti-adhesive coatings
- Self-cleaning surfaces
- Nano-reinforced coatings for increased scratch resistance
- Anti-fingerprint coatings
- Modification of the wettability of surfaces

Application example Nano colours



In "nano-thin" layers, **Attophotonics** can generate colours on any surface without the use of chemical colour pigments. A wide range of colours can be directly applied to any surface with the same chemistry and efficient material usage. The colours create a smart and modern metallic effect; they are bleach stable; and on request, they can be provided with extreme heat stability (up to 600 °C) and machine-readable. They can therefore also be used for colour bar codes and security labels. The application possibilities of the technology range from novel surface designs through POC diagnostics all the way to intelligent packaging that visually displays the quality and durability of the contents. ■

Application example

Functional coatings for industrial applications



A wide spectrum of expertise in surface technology as well as in materials analysis gives CEST the ability to develop and produce functional coatings and dispersion coatings. Some examples of this include:

- Pressure roll coatings with structural chrome
- Metallisation of composite materials for the aerospace industry
- Micro and nano structured electrode materials
- Optimised alloys for prevention of corrosion
- Depositing refractory metals from ionic liquids

Application example

Testing facilities for industrial applications



At FOTEC in recent years, numerous customer-specific test facilities for the inspection of parts and components have been developed, for example, for verification of wiring harnesses and circuit boards, for optical measurement of ball bearing cages or for the functional testing of injection moulded part inserts. For these types of testing activities, the test routines and hardware and software were designed, and the testing facilities were manufactured and tested industrially. ■

Development of functional coatings and coating processes for metallic and non-metallic surfaces and materials



"CEST acts as an innovation incubator and trendsetter at the crossroads of science and industry".

Priv. Doz. Prof. (FH) DI Dr. techn.
Christoph Kleber
Director of Science, CEST

Development and implementation of automated measuring and testing systems

Development of innovative electrochemical processes for customized functional high-tech coatings via puls and dispersion separation

Characterization and examination of coatings, varnish and adhesives



"Through the testing and evaluation of coating systems, we ensure the functionality of surfaces".

Dr. Dietmar Loidl
Technical Director, OFI

Application example

Customised high-tech functional surfaces



With the most advanced electrochemical coating methods, such as the complex pulse plating, uniform, functional coatings can be created from complex work pieces and special, previously unattainable alloys are deposited. The surface of the work piece can be adapted in its capacity to the requirements of the coating applied, e.g. through setting the hardness, the micro structure or the defined magnetic properties. ■

Application example

Ageing properties of surfaces



In order to estimate how a product behaves during its entire service life, it is important to be able to predict the ageing properties of various material surfaces. As part of a multi-year project, OFI has developed methods with which often, after just 48 hours, statements can be made about the ageing processes. Thus, it is possible, for example, using chemiluminescence methods, to observe oxidation processes prior to visual damage occurring, or to measure the corrosion protection of a coating through its ion permeability. Ultrasound microscopy and thermography, in turn, are suited for detecting damage in the structure of materials at an early stage, without the need to use ionizing radiation. With these methods, various products have been studied, such as photovoltaic modules or organically coated metal pipes. ■



Technopol Wiener Neustadt is characterised by the five fields of technology, shown below, in medical and material technologies. The focus here is on the integration of research, education and business:

- Material ■ tribology (friction, wear, lubrication)
- Medical engineering ■ sensor-actuator ■ surfaces

The Technopol figures speak for themselves: e.g. **500** researchers, **3500** students, **17,500** m² of office and laboratory space, 4 COMET competence centres for tribology, electro chemistry, medical engineering and bio-resorbable implant materials, Fotec GmbH as a research company in the nearby University of Applied Sciences, the Centre for Integrated Sensor Systems of the Danube University at Krems, the business unit "Biomedical Systems" of the AIT - Austrian Institute of Technology, the Department of "Surface Engineering" of the OFI, as well as MedAustron, the cancer research and treatment centre, which is still under construction, AAC, Happy Plating, Attophotonics, FIANOSTICS and many others. NOSTICS und viele andere mehr.

- Concentrated competence ■ Successful collaborations
- Excellent education

The Technopol manager, active on-site, supports the development of the site as part of the Technopol programme.



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In this brochure, all person-related statements apply equally to women and men. It is merely for the sake of simplicity that the masculine form was selected in the text.