MATERIAL COMPETENCE

in education, research and business

Materials are becoming increasingly smart - intelligent, customised & environmentally friendly. Topics such as Green Chemistry, lightweight, multifunctional material composites, material efficiency and substitution, properties (chemical, mechanical, etc.), premature material damage, and material simulation are all increasingly in focus. At the Technopol Wiener Neustadt, a high concentration of competence in this field of technology has been created. The figures speak for themselves:

8 research facilities
25 areas of expertise
112 employees

Foto: AAC

TECHNOPOL WIENER NEUSTADT

The research institutes at the Technopol Wiener Neustadt have successfully put their expertise to use in the materials technology field in many applications. In the following pages, we present some examples.

- **Development and optimization** of biocompatible and biodegradable metals, specific production processes and resulting products

- **Implementation** of routine analytics of coatings and coating media and customized development of (nano) analysis instruments

MATERIALS

- **Development** of customized sensors and actuators for sophisticated measurement and control tasks

- **Manufacturing** of highly resilient light metal coatings via patented electrochemical coating processes
- **Prototyping** of innovative galvanic layersystems for components with highest precision and performance

- **Manufacturing** of prototypes, parts and pilot series of highly challenging components using additive manufacturing processes (3D printing)
- **Development and testing** of chemical reactors and highly efficient combustion systems
- **Development and testing** of propulsion systems for space applications
- **Development and testing** of Hydrogene storage systems with highest energy density
- **Development** of ready-to-use production processes for challenging plastic/ceramic and metal components by (powder) injection moulding
- **Development and testing** of miniaturized energy converters
- **Development and testing** of ion emitters

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- **Characterization and examination** of coatings, varnish and adhesives
- **Analysis and development** of materials, products and methods in the sector of pharma, medical devices and hygienics
- **Analysis, development and examination** of polymer materials and plastic products
- **Examination** of buildings, development of renovation concepts and support of building renovations

Technopol Wr. Neustadt
www.ecoplus.at/technopole

· Forschung
· Ausbildung
· Industrie

AAC
aerospace & advanced composites

- **Analysis and examination** of materials and components for extreme operating conditions
- **Development, manufacturing and monitoring** of composite fiber components with integrated functions
- **Development and manufacturing** of functional surfaces by means of nano particles
- **Execution** of testing systems to examine high-performance materials, components and procedures for extreme operating conditions
- **Development** of composite materials and components for specific abrasion systems

CEST
competence center

- **Development** of funcional 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

Self-lubricating gear for aerospace applications

In the field of aerospace technologies, lubrication of sliding and rolling bearings with solid lubricants or polymers with good sliding properties are among the focusses of AAC. Here, composite materials or filled polymers are used. Currently, in the context of a project financed by ESA, the development of a new composite material is under way, which is based of PTFE. AAC is contributing its expertise in the testing and qualification of materials and components for aerospace applications, but can also bring its expertise to the table in the dispersion of nano particles and nano fibres, and in the design of the material composition. ■

Application example

Structural Health Monitoring of fibre composite components in aviation

The use of fibre composite components has risen sharply in recent years, but their potential has not yet been able to be fully exploited due to uncertainties in forecasts regarding remaining service life. A system for non-destructive testing, which will be done over the long term and on-line (so-called "Structural Health Monitoring"), could lead to a substantial reduction in downtime and cost of ownership in terms of maintenance. AAC is developing methods and algorithms for off-line and on-line detection of defects and the ability to forecast the remaining service life for composite structures. The basis for this is passive and acoustic methods, as well as the measurement of local strain by means of distributed fibre optic sensors. ■

Analysis and examination of materials and components for extreme operating conditions

Development, manufacturing and monitoring of composite fiber components with integrated functions

Foto: Markus Digruber

Exploring corrosion mechanisms and development of sophisticated solutions in corrosion protection

Manufacturing of highly resilient light metal coatings via patented electrochemical coating processes

"Based on intensive research, we have freed electrochemical surface treatment from the restrictions of the conventional solutions".

Mag. Dr. Wolfgang Hansal, CEF-3
CEO of Happy Plating

Application example

Optimised corrosion protection solutions and procedures

With its extensive equipment facilities and expertise in researching corrosive processes, **CEST** is well equipped to develop corrosion protection solutions for various applications and to process suitable treatment measures for prevention of corrosion. These include, for example, the improvement of corrosion inhibitors, chromate-free corrosion protection coatings, baths based on less toxic and legally permitted chromium III compounds, chromium-free passivation solutions, chromium-free sampling pretreatments, conversion mechanisms, alternatives to pure zinc, such as zinc alloys with a higher self-corrosion protection. ■

Application example

Electroplating of aluminium parts

Using the patented "**Happy Plating** Rampart" process, for the first time ever, aluminium parts on sensitive, thermal and tribological stress points can be used, for example, in the engine sector. The aluminium components produced combine surface hardness with a decorative appearance and the highest load capacity. In this way, the "**Happy Plating** Rampart" process can become a trailblazer for a new generation of engine construction (e.g. for camshaft-free valve control). ■

Application example

Injection-moulded parts for the metal, engineering and automotive industries

FOTEC is developing production processes based on metal injection moulding, in which metallic powder, such as stainless steel or carbide, can be processed by injection moulding for components. Examples of this include mills for timber, cylinder locks, furniture fittings, and cutlery.

In the automotive industry, two-component ceramic parts are produced by means of ceramic injection moulding. Examples of this include brakes, valve seats and glow plugs. Also, piezoceramic components for complex 3D sensors are produced. ■

Development of ready-to-use production processes for challenging plastic/ceramic and metal components by (powder) injection moulding

"In almost all of FOTEC's R&D priorities – starting with developments for the aerospace industry up to 3D printing of metals – materials science is given a high priority".

DI (FH) Helmut Loibl, MSc
CEO of Fotec

Application example

Restoration and repair of underground car parks and bridges

OFI performs extensive renovations and repairs on underground car parks and bridges. These include:

- Detection of construction stage and documentation of damages
- Concrete strength analyses, determination of carbonation depths, detection of reinforcement status, investigation of chloride contamination, testing of likelihood of corrosion through potential field measurements
- Creation of a renovation design, including service specifications and bidding
- On-site construction supervision

Examination of buildings, development of renovation concepts and support of building renovations

Manufacturing of prototypes, parts and pilot series of highly challenging components using additive manufacturing processes (3D printing)

Analysis, development and examination of polymer materials and plastic products

Foto: Happyplating

Application example

Heat exchange for hydrogen storage

A recent example of equipment produced by means of a generative manufacturing process in the field of energy technology is a heat exchanger for metal hydride hydrogen storage. Here, a metal powder hydrogen is added through the smaller of the two channels and the heat from the highly exothermic reaction is then discharged through the second, larger channel by means of oil. ■

Application example

Competence platform for Active & Intelligent Packaging

In the field of active and intelligent packaging systems (AIP), there is great, often untapped potential. While on the one hand, existing packaging concepts cannot be used due to ignorance of them, on the other hand, there is a lack of customised solutions for certain product areas. As part of the AIP competence platform assembled by **OFI**, together with the plastic and food cluster, intelligent packaging systems across all sectors are being working on. Some examples include:

- Absorber technologies for light, oxygen, ethylene, acetaldehyde
- Release technologies, e.g. antimicrobial packaging materials
- Modified atmosphere packaging
- Shelf life and freshness indicators for food packaging

TECHNOPOL WIENER NEUSTADT

Europäische Union Investitionen in Wachstum & Beschäftigung. Österreich.

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.

This brochure is also available as an e-paper. Simply scan the QR code or download it at:

www.tfz-wienerneustadt.at

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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.

Die Wirtschaftsagentur des Landes Niederösterreich