



AMAT - Advanced Materials & Aerospace Technologies

MATERIALS DEVELOPMENT



THE AMAT – ADVANCED MATERIALS AND AEROSPACE TECHNOLOGIES

business unit of Austrian Institute of Technologies - AIT comprises a team of more than 70 experts from the field of materials and process engineering. Our employees work with partners from industry to develop new processes, products and system solutions for materials and process engineering. Interdisciplinary collaboration between experts from the different fields of technology is the strength of our research company – and thus a particular advantage for you the customer.

Our customers come from various sectors of industry, including steel and metals, electronics, polymers and composites, aerospace, machinery and equipment, and the automotive supply industry.

In collaboration with our customers and partners, we operate the following centres of competence:



Space Materials Testhouse under contract to the European Space Agency ESA/ESTEC, Seibersdorf



Centre of Competence for Micro- and Nanocharacterization (CCMNC), Seibersdorf



Knet Austrian Aeronautic Research (AAR) Competence network for aerospace technology/composite and lightweight materials



Kplus Austrian Centre of Competence for Tribology (AC2T), Wiener Neustadt (shareholding)

A number of independent divisions, companies and shareholdings have originated in the AMAT group:

- Centre of Competence for Applied Electrochemistry (Kplus ECHEM), Wiener Neustadt
- Centre of Competence for Light Metals (Kplus LKR), Ranshofen
- AIT Biomedical Systems Business Unit, Seibersdorf, Wiener Neustadt, Linz, Graz, Innsbruck, Vienna

We provide the expertise and technical infrastructure for:

- Materials characterization and failure analysis
- Problem analysis and consulting
- Feasibility studies and preliminary testing
- Development of materials and production processes
- Prototype systems: development, testing and installation
- Coordination of and collaboration in national and international funded R&D programmes

MATERIALS DEVELOPMENT

We help you to develop new materials with improved properties and materials with an improved cost-benefit ratio.

We focus on the following materials:

- Special steels and high-temperature materials
- Hard materials and ceramics
- Polymer composites
- Nanoscale materials
- Ceramic and metal matrix composites
- Surface-treated materials

For example: modern special steels are high-tech products. We determine the microstructure down to the finest precipitation or interface in the range of a few nanometres and use these findings to derive optimized compositions and process parameters.

The resulting improvements in strength, toughness, deformability or creep resistance etc. are used, for example, in automobiles, power stations and consumer goods.

MATERIALS PROCESS ENGINEERING

With a focus on practical applications, we work with new process technologies to manufacture and process new low-cost materials with improved properties.



We focus on:

- Powder technology: pressing, sintering, hot pressing
- Powder injection moulding
- Wet-chemical nanodispersion processes
- Hydrothermal sol-gel processes
- "Nanojet" high-pressure mixer jet system
- Coating processes for nanoparticle dispersions
- Severe plastic deformation
- Infiltration processes



MATERIALS CHARACTERIZATION

We interpret test results in terms of application properties as well as development and optimization potential of the material or process.



We focus on:

- Aerospace-specific properties
- Micro- and nanocharacterization and interface analysis
- Thermophysical and mechanical properties
- Low-temperature testing and cryotechnology
- Tribology
- Various testing facilities, including testing under vacuum or at specific temperatures
- Non-destructive materials testing
- Modelling and simulation

Our specialists investigate transformation behaviour, deformation and precipitation processes, determine micro-structure parameters for numerical simulations, and make lifetime predictions. On request, we can tailor our services to your very specific requirements.

AEROSPACE

We develop and test materials and components for the aviation industry and space applications.



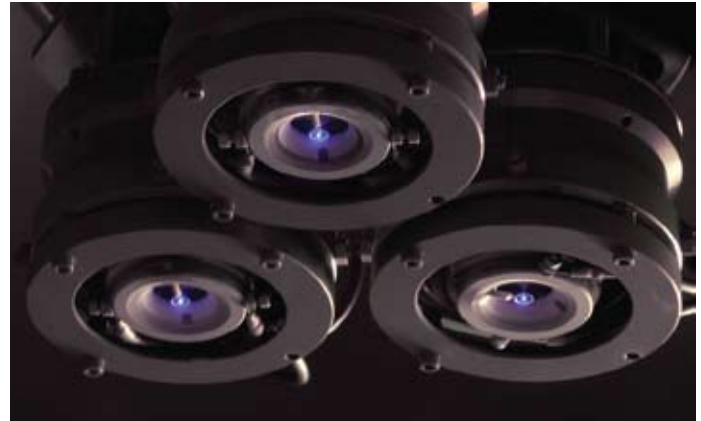
We focus on:

- Testing materials and components, including tests under simulated aerospace conditions
- Micro and nano analysis
- Characterization and development of lightweight and composite materials



We focus on: (continued)

- **Advanced composites**
Materials and process development in the field of polymer composites
- **Development of high-temperature ceramics and coatings**
- **Development of metal matrix materials and coatings for tribological applications**
- **Health monitoring** (online recording of component behaviour), lifetime predictions
- **Austrian Aeronautics Research (AAR) network**
AAR was the first Austrian initiative to form an aerospace cluster. Coordinated by AIT, AAR is now a technology partner of the international aerospace industry including Airbus, EADS and Boeing.
- **Space Materials Testhouse**
The Space Materials Testhouse supports ESTEC in materials characterization and the work flows of industry suppliers. The goal of this collaboration is to evaluate new technologies for space missions.
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SPACE APPLICATIONS

Focus: microthrusters and micro energy systems

- Ion sources for space instruments
- Ion emitters for precision thrusters – FEETP (field emission thrusters)
- μ PPT (micro-pulsed plasma thruster)
- Mono- and bipropellant for satellites with telecommunications and scientific functions
- Charge compensators for satellites
- Casimir force – simulation software
- Hydrogen storage technology development and tests for space and terrestrial applications

Our partners in space activities:

ESA, NASA, ASTRIUM, ALR, SANDIA, Vienna University of Technology, US Air Force

AMAT scientists can test materials and functions under the most extreme environmental conditions – for example, key parameters for re-entry of a spacecraft into the earth's atmosphere can be simulated in our re-entry chamber.

CONTACT

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