Our range of services:

- Qualitative and quantitative X-ray phase analysis (25 to 1400°C)
- Determination of retained austenite by X-ray analysis (25 to 1400°C) with the Rietveld method, including depth profiles
- X-ray phase and structure analysis of thin surface films
- Determination of fibre textures in coating systems (25 to 900°C)
- Determination of processes-induced residual stresses on surfaces by X-ray analysis (25 to 1000°C)
- Determination of depth profiles of residual stresses on specimens and components (e.g. gears, components) by X-ray analysis
- Mobile air-side residual stress measurement on large components or materials
- Determination of phase transformation temperatures and enthalpies with simultaneous mass and element analysis for determining oxidation and decomposition processes up to 1600°C in vacuum, inert (Ar, N₂) or oxidic atmospheres
- Measurement of time-temperature transformation and precipitation diagrams (isothermal and continuous, TTT, TTP)
- Chemical analysis of materials by optical emission spectrometry** and X-ray fluorescence analysis
- Measurement of carbon and nitrogen depth profiles on thermally-treated steels
- Chemical depth profile analysis of thin films (e.g. nitride / carbide / oxide films)

* in cooperation with our scientific partners

Our equipment:

- X-ray diffractometer Bruker D8 Advance for phase analysis with HTK 2000 high-temperature chamber for the detection of fast phase transformations in inert and oxide atmospheres (25 to 1600°C)
- X-ray diffractometer Bruker D8 Discover for residual stress and texture analysis with Paar DHS 900 high-temperature stage up to 900°C
- Mobile X-ray diffractometers Dmax2550, Dmax2000, Dmax2010 with integrated depth measurement and automatic testing table, also suitable for measuring residual stresses and in-situ measurements on test equipment
- High-resolution glow discharge spectrometer (GD-OES) from Jobin-Yvon HR 4000 UV/Vis spectrophotometer
- Netzsch differential scanning calorimeter DSC/DTA STA-409C (up to 1400°C) for measurements in vacuum, inert (Ar, N₂) or oxide atmospheres
- Quenching dilatometer Q400, from Netzsch with inductive heating systems (25 to 1300°C) and integrated gas cooling system (N₂, He)
- Handheld X-ray fluorescence analyzer S1TurboLE from Bruker

---

** in cooperation with our scientific partners
EXPERTISE AND HIGH-TECH EQUIPMENT
FOR YOUR SUCCESS

Physical / Chemical Laboratory

Our expertise is your benefit

The Materials Center Leoben offers a unique mix of theoretical and practical expertise and state-of-the-art facilities, making it a flexible and experienced partner for demanding research, development and application tasks in the areas of materials engineering, process engineering, quality assurance and component design.

The physical / chemical laboratory specializes in the characterisation of materials in terms of the following properties:

- Crystallographic structure
- Phase composition
- Residual stress
- Surface topography
- Chemical composition

The physical / chemical laboratory of the Materials Center Leoben offers both standard methods – such as determination of retained austenite and residual stress measurement – and highly specialized methods for innovative solutions in materials research and process development.

Our fields of expertise

- Determination of phase structure and structural parameters in intact and surface modified components
- Determination of phase transformations such as magnetic transformations and lattice transformations
- Determination of temperature-dependent structural parameters
- Determination of phase fractions in multi-phase materials using powerful analytical methods (Rietveld analysis)
- Determination of crystallographic structure parameters as a function of temperature

Qualitative and quantitative phase analysis

High-temperature properties and phase transformations

Chemical analysis

- Determination of phase fractions in intact and surface modified components
- Determination of phase transformations such as magnetic transformations and lattice transformations
- Determination of residual stresses in intact and surface modified components
- Detection of phase transformations as a function of temperature

- Determination of temperature-dependent structural parameters
- Measurement of fibre textures in coating systems
- Determination of crystallographic structure parameters as a function of temperature

- Chemical analysis using optical emission spectrometry and X-ray fluorescence analysis
- Determination of chemical depth profiles of modified surface layers and coated surfaces

CRITICAL ASSESSMENT

- Determination of residual stresses in intact and surface modified components
- Determination of phase transformations such as magnetic transformations and lattice transformations
- Determination of residual stresses in intact and surface modified components
- Determination of residual stresses in surface layers of components, specimens and coatings
- Determination of residual stresses in intact and surface modified components
- Determination of phase reactions (e.g. oxidation, decomposition) with simultaneous measurement of volatile components

- Determination of heat capacity
Physical / Chemical Laboratory

Chemical analysis

- Determination of phases, phase transformations, structure parameters and residual stresses at elevated temperatures and different atmospheres.

Qualitative and quantitative phase analysis

- Determination of phase structure and structural parameters in ores, minerals, different steels, and different atmospheres using state-of-the-art X-ray analysis and advanced evaluation methods.

Residual stress measurement

- X-ray analysis of residual stresses in surface layers of components, specimens and coatings.

High-temperature properties and phase transformations

- Determination of phases, phase transformations, structure parameters and residual stresses at elevated temperatures and different atmospheres.

Expertise and High-Tech Equipment

For your success

MATERIALS CENTER LEOBEN

Physical / Chemical Laboratory

Our expertise is your benefit

The Materials Center Leoben offers a unique mix of theoretical and practical expertise and state-of-the-art facilities, making it a flexible and experienced partner for demanding research, development and application tasks in the areas of materials engineering, physics, engineering, quality assurance and component design.

The physical / chemical laboratory specializes in the characterization of materials in terms of the following properties:

- Crystallographic structure
- Phase composition
- Residual stresses
- Surface topography
- Chemical composition

The physical / chemical laboratory of the Materials Center Leoben offers both standard methods – such as determination of retained austenite and residual stress measurement – and highly specialized methods for innovative solutions in materials research and process development.

- Examination of steels, especially high-alloy, multiphase stainless steels
- Expertise in carbide / nitride and oxide hard coatings and ceramic materials
- Determination of phase fractions in multiphase materials using powerful analysis methods (e.g., Rietveld analysis)
- Determination of fibre textures in coating systems
- Determination of crystallographic structure parameters as a function of temperature
- Measurement of pole figures of an electrical sheet
- Determination of phase structure and structural parameters at room temperature, elevated temperatures and different atmospheres using state-of-the-art X-ray analysis and advanced evaluation methods.

- Determination of retained austenite and residual stress measurement – and highly specialized methods for innovative solutions in materials research and process development.

- Chemical analysis
- Determination of retained austenite content in a case hardened component
- Measurement of pole figures of an electrical sheet
- Determination of phases, phase transformations, structure parameters and residual stresses at elevated temperatures and different atmospheres.

Physical / Chemical Laboratory

Our expertise is your benefit

The Materials Center Leoben offers a unique mix of theoretical and practical expertise and state-of-the-art facilities, making it a flexible and experienced partner for demanding research, development and application tasks in the areas of materials engineering, physics, quality assurance and component design.

The physical / chemical laboratory specializes in the characterization of materials in terms of the following properties:

- Crystallographic structure
- Phase composition
- Residual stresses
- Surface topography
- Chemical composition

The physical / chemical laboratory of the Materials Center Leoben offers both standard methods – such as determination of retained austenite and residual stress measurement – and highly specialized methods for innovative solutions in materials research and process development.
Physical / Chemical Laboratory

Our expertise is your benefit

The Materials Center Leoben offers a unique mix of theoretical and practical expertise and state-of-the-art facilities, making it a flexible and experienced partner for demanding research, development and application tasks in the areas of materials engineering, process engineering, quality assurance and component design.

The physical / chemical laboratory specializes in the characterization of materials in terms of the following properties:

- Crystallographic structure
- Phase composition
- Residual stress
- Surface topography
- Chemical composition

The physical / chemical laboratory of the Materials Center Leoben offers both standard methods – such as determination of retained austenite and residual stress measurement – and highly specialized methods for innovative solutions in materials research and process development.

Qualitative and quantitative phase analysis

Determination of phase structure and structural parameters in steels, especially high-alloy, multiphase stainless steels and carbide/nitride/oxide hard coatings and ceramic materials. Determination of phase fractions in multiphase materials using powerful analytical methods (e.g., Rietveld analysis). Measurement of fibre textures in coating systems. Determination of crystallographic structure parameters as a function of temperature.

Residual stress measurement

8-ray analysis of residual stresses in surface layers of components, specimens and coatings.

High-temperature properties and phase transformations

Determination of phases, phase transformations, structure parameters and residual stresses at elevated temperatures and different atmospheres.

Chemical analysis

Chemical analysis using of materials analysis with optical emission spectroscopic and X-ray fluorescence analysis and determination of chemical depth profiles of modified surface layers and coated surfaces.

EXPERTISE AND HIGH-TECH EQUIPMENT

FOR YOUR SUCCESS

Physical / Chemical Laboratory

Our fields of expertise

- Exhaustion of steels, especially high-alloy, multiphase stainless steels
- Expertise in carbide/nitride/oxide hard coatings and ceramic materials
- Determination of phase fractions in multiphase materials using powerful analytical methods (e.g., Rietveld analysis)
- Measurement of fibre textures in coating systems
- Determination of crystallographic structure parameters as a function of temperature

Chemical using of materials analysis with optical emission spectroscopy and X-ray fluorescence analysis and determination of chemical depth profiles of modified surface layers and coated surfaces.

On-site X-ray fluorescence analysis

On-site residual stress measurements on components

Determination of phases, phase transformations, structure parameters and residual stresses at elevated temperatures and different atmospheres.

Chemical analysis

- Determination of phases, phase transformations, structure parameters and residual stresses at elevated temperatures and different atmospheres.
- Detection of phase reactions (e.g. oxidation, decomposition) with simultaneous measurement of volatile components.
- Determination of heat capacity.

On-site X-ray fluorescence analysis

On-site residual stress measurements on components

Determination of phases, phase transformations, structure parameters and residual stresses at elevated temperatures and different atmospheres.

Chemical analysis

- Determination of phases, phase transformations, structure parameters and residual stresses at elevated temperatures and different atmospheres.
- Detection of phase reactions (e.g. oxidation, decomposition) with simultaneous measurement of volatile components.
- Determination of heat capacity.
RANGE OF SERVICES AND EQUIPMENT

Our range of services

- Qualitative and quantitative X-ray phase analysis (25 to 1400°C)
- Determination of retained austenite by X-ray analysis (according to ASTM E 975-03 or using the Rietveld method, including depth profiles)
- X-ray phase and structure analysis of thin surface films
- Determination of fibre textures in coating systems (25 to 900°C)
- Determination of residual stresses on surfaces by X-ray analysis (25 to 900°C)
- Determination of depth profiles of residual stresses in specimens and components (e.g. gear components) by X-ray analysis
- Mobile air-plasma residual stress measurement on large components or materials
- Determination of phase transformation temperatures and entropies with continuous mass and element analysis for determining oxidation and decomposition processes up to 1000°C in vacuum, inert (Ar, N₂) or oxidic atmospheres
- Measurement of time-temperature-transformation and precipitation diagrams (isothermal and continuous, TTT, TTP)
- Chemical analysis of materials by optical emission spectrometry* and X-ray fluorescence analysis

Our equipment

- X-ray diffraction meter Bruker D8 Advance for phase analysis with HTK 2000 high-temperature chamber for the detection of fast phase transformations in inert and oxidic atmospheres (25 to 1400°C)
- X-ray diffraction meter Bruker D8 Discover for residual stress and texture analysis with Paar DHS 900 hot stage up to 900°C
- Mobile X-ray diffraction system Siemens XStruction XRD 2000 with integrated depth measurement and automatic testing table, also suitable for measuring residual surfaces and in-situ measurements on test equipment
- High-resolution glow discharge spectrometer (GDOES) from SIDOR, JOBLIN VMF 480 profilometer
- Netzsch differential scanning calorimeter DSC/DTA STA-409C up to 1400°C for measurements in vacuum, inert (Ar, N₂) or oxidic atmospheres
- Quenching dilatometer DIL805L from Bähr with inductive heating system (25 to 1300°C) and integrated gas cooling systems (N₂, He)
- Handheld X-ray fluorescence analyser S1TurboLE from Bruker

* in cooperation with our scientific partners

ISO 9001 CERTIFIED
Our range of services

- Qualitative and quantitative X-ray phase analysis (25 to 1400°C)
- Determination of retained austenite by X-ray analysis (according to ASTM E 975-03 or using the Rietveld method, including depth profiles)
- X-ray phase and structure analysis of thin surface films
- Determination of film textures in coating systems (20 to 1900°C)
- Determination of processes-induced residual stresses on surfaces by X-ray analysis (25 to 1000°C)
- Determination of depth profiles of residual stresses on specimens and components (e.g. gear components) by X-ray analysis
- Mobile on-site residual stress measurement on large components or materials
- Determination of phase transformation temperatures and enthalpies with simultaneous mass and element analysis for determining oxidation and decomposition processes up to 1800°C in vacuum, inert (Ar, N₂) or oxidative atmospheres
- Measurement of time-temperature transformation and precipitation diagrams (isothermal and continuous, TTT, TTP)
- Chemical analysis of materials by optical emission spectrometry* and X-ray fluorescence analysis
- Measurement of carbide and nitrogen depth profiles on thermally-cycle ion-milled specimens
- Chemical depth profile analysis of thin films (e.g. nitride / carbide / oxide films)

* in cooperation with our scientific partners

Our equipment

- X-ray diffractometer Bruker D8 Advance for phase analysis with HTK 2000 high-temperature chamber for the detection of fast phase transformations in inert and oxide atmospheres (25 to 1600°C)
- X-ray diffractometer Bruker D8 Discover for residual stress and texture analysis with Paar DHS 900 hot stage (up to 900°C)
- Mobile X-ray diffractometers Drintech Xlines 3000 (25/100°C) with integrated depth measurement and automatic testing table, also suitable for measuring residual surfaces and in-situ measurements on test equipment
- High-resolution glow discharge spectrometer (GDOS/ESI) from HORIBAJOBIN YVON (HR profiler)
- Netzsch differential scanning calorimeter (DSC/DTA STA-449C) up to 1400°C for measurements in vacuum, inert (Ar, N₂) or oxidative atmospheres
- Quenching dilatometer DIL805L from Bähr with inductive heating system (25 to 1300°C) and integrated gas cooling systems (N₂, He)
- Handheld X-ray fluorescence analyser STTurboLE from Bruker

ISO 9001 CERTIFIED

EXPERTISE & RELIABILITY