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Omega/Theta

for ultra-fast crystal orientation and rocking curve measurements

The universal Omega/Theta X-ray diffractometer is a fully automated vertical three axes diffractometer to determine the orientation of various crystals using Omega-scan method and to determine rocking-curve measurement using Theta-scan method.

+ Ultra-fast Omega-scan approach

- 200 times faster than Theta-scan method
- Automatic evaluation of the complete lattice orientation in 3D
- Determination of crystal orientation within 5 seconds

+ User friendly and cost effective

- Convenient sample handling and easy to operate
- Advanced user friendly software
- Low energy consumption and operating costs

+ For research and production quality control

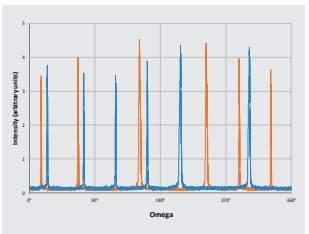
- Omega/Theta-scan in a single device
- Azimuthal setting and marking of crystal orientation
- Highest precision, i.e. up to (1/1000)°
- Rocking curve measurement using Theta-scan method

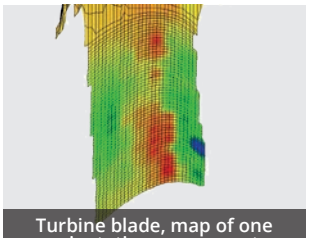
+ Modular design and flexibility

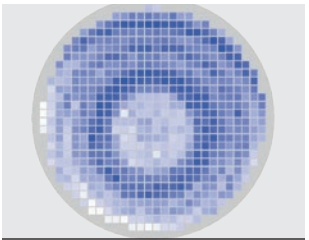
- Future proof with various upgrade options
- Customized solutions for special application based on customers' request
- Optical recognition of flat and notch

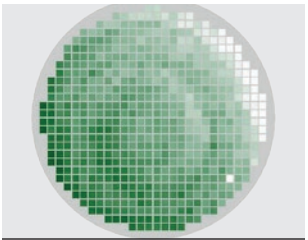
Highlights

- Fully automated complete lattice orientation measurment of single crystals
- Ultra-fast crystal orientation measurement using Omega-scan method
- Automated rocking-curve measurement after orientation determination or automatic reflection search
- Angular resolution of the diffractometer: 0.1 arc sec.
- Sample size up to 450 mm
- Appropriate for research and production quality control


Omega-scan diagram (SiC)

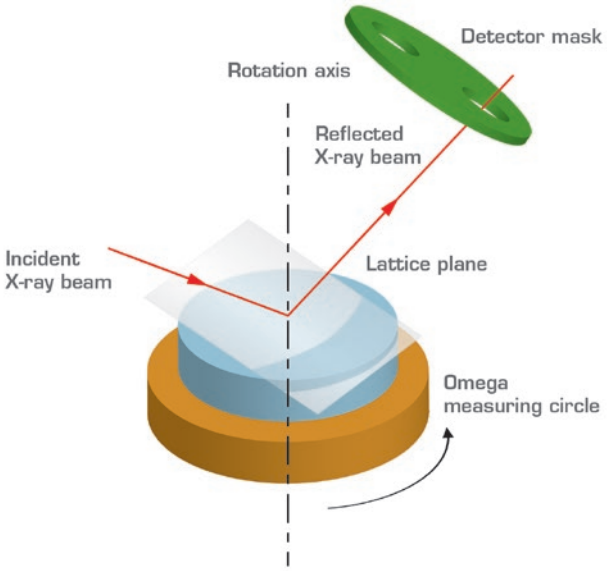

Turbine blade, map of one orientation component


(Si, Ge) wafer, orientation map


lattice parameter map

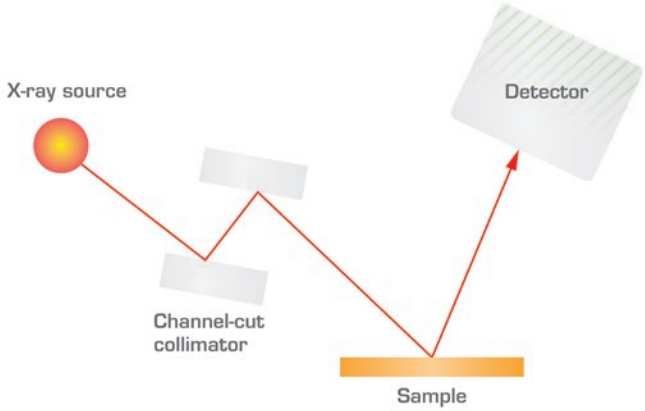
Omega-scan method

All desired crystal orientation parameters are captured in one rotation within 5 seconds.



Rocking-curve measurement

Arrangement with channel-cut crystal collimator.



Technical specifications

X-ray source	Standard X-ray tube, Cu anode
Detector	Scintillation counter (single or double)
Sample holder	Precise turntable (accuracy 0.01°), mounting plate and tools for sample adjustment
Crystal collimator	Primary Ge or Si channel-cut collimator, measurable minimal broadening: < 10 arc sec.
Mapping	x-y table, lateral resolution 0.1 mm
Dimensions	H 1950 mm × D 820 mm × W 1200 mm
Weight	650 kg
Power supply	208-240 V, 16 A single phase, 50-60 Hz
Water cooling	Flow – 4l/min, max. pressure 8 bar, T ≤ 30° C

Options

- Laser scanner for sample shape measurement
- Photographic camera and image processing for flat and notch determination
- Further sample rotation axis for 3D mapping
- Secondary channel-cut collimator (analyzer)
- Equipment for sample adjustment
- X and Y axis movement for orientation mapping

Special applications

- Orientation mapping of turbine blades (single-crystalline Ni based superalloys)
- Determination of lattice parameters [(Si, Ge) solid solutions]
- High-resolution diffraction (reciprocal-lattice mapping)

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