

X-ray Laboratory

Principle

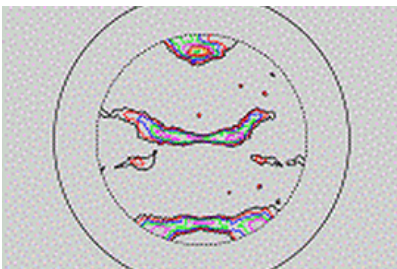
X-ray diffraction is a mandatory part of the characterization of every crystallized material. By comparing the peak positions with a database, the phases present can be identified. Furthermore, the shift of the X-ray reflections delivers information about stoichiometry and the formation of solid solutions.

By analyzing the reflex intensities or even the intensity distribution in the whole diffractogram (Rietveld refinement) quantitative phase analysis of mixtures or structure refinement are possible.

The relative spatial arrangement of the crystallites of a sample is analyzed by means of texture analysis. For this, the orientation dependent distribution of diffracted intensity is measured. The resulting texture diagrams contain valuable information for the understanding of deformation or failure mechanisms of metals or ceramics and information about the growth and reaction characteristics as well as the properties of layered systems.

The radiographic inspection of a component as an additional technique is a fast and non-destructive test method for the detection of faults or the examination of production steps.

X-ray powder diifractogram of a two TiAl alloy



Instrumentation:

- X-ray powder diffractometer Siemens D5000 (Bragg-Brentano-focusing)
- X-ray texture diffractometer Siemens D5000TX
- Radiographic X-ray inspection chamber Hellwett Packard Faxitron

Application

Characterization of crystallized material

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This handout, and cross-references to related measurement techniques and facilities are available at: <http://messtec.dlr.de/link-549-en>.