LAB SOFT

The Crystallographic Texture Standards

Texture analysis based on experimental pole figures registered by the X-ray diffraction techniques both by the transmission method (Decker, Asp and Harker, 1948, J.Appl. Phys., 19, 388) and by the back-reflection one (Schulz, 1949, J.Appl. Phys., 20, 1033) needs appropriately prepared input data. Due to defocusing effects, background of diffraction signal (non-coherent scattering), changeable penetration depth (statistics of counts), etc., a suitable correction of experimental data should be assured. Such refined data set in the form of the experimental, corrected and normalized pole figure(s) is a basis of texture analysis. The application of suitable calculating procedures enables to obtain the orientation distribution function (ODF) and then the complete pole figures or the inverse ones. Verification of the experimental conditions of measurement and correction of the rough texture data should be done on the basis of collected data on the texture standards.

The types of texture standards and their denotations

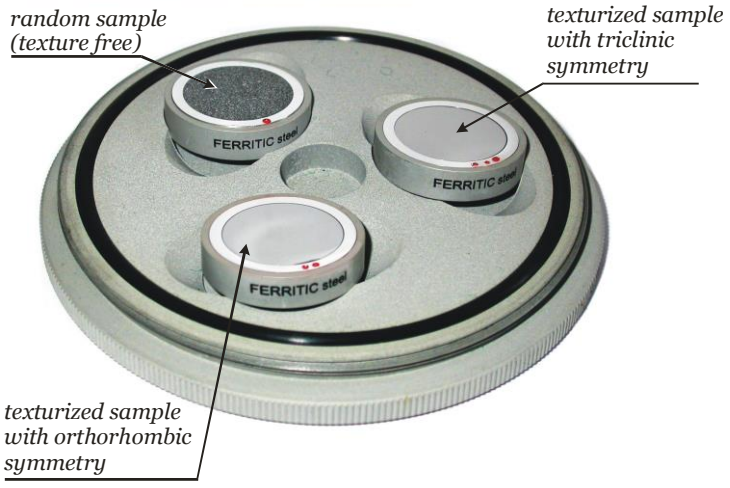
(the marker's colour are placed on the metal rings surrounding the reference samples)

Colour code	Material	Letter code
● *blue*	AUSTENITIC stainless steel	BK-ASS
● *red*	FERRITIC stainless steel	BK-FSS
● *orange*	COPPER alloys	BK-COA
● *green*	TITANIUM (α-Ti)	BK-TIA
● *black*	ALUMINIUM alloys	BK-ALA

The measurable areas of the reference samples (top sample surface) are homogeneous from the texture viewpoint and have been prepared for registration of the diffraction effects in the back-reflection mode by the Schulz method. Because of the measurement technique of the back-reflection pole figures (tilting the sample and its rotation around the normal direction), recommended beam size (the largest dimension of its cross section) should not exceed the values given in following table:

Range of pole figure (alpha angle)	Recommended beam size [mm]
0 ÷ 75°	5.1
0 ÷ 80°	3.4
0 ÷ 85°	1.7

Crystallographic texture, of the reference samples are analyzed by the Accredited Testing Laboratory in the field of texture analysis. Laboratory meets requirements of the European Norm EN ISO/IEC 17025. Applying the Integrating Method (IM) of registration and correction by means of the random (texture free) sample assures obtaining a reliable **"device-independent"** pole figures for quantitative texture analysis. The reference samples and the attached results allow evaluating the correctness of the procedure of texture analysis applied in your laboratory. The measurement details, files with data in LaboTex format, results of the texture analysis are registered on the CD and in the manual. The CD contains also files with pole figures data received by Peak Intensity Method (PIM). More information can be found on the LaboSoft WWW pages: http:// labosoft.com.pl or http://labotex.com



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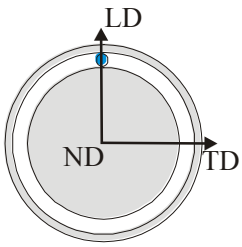
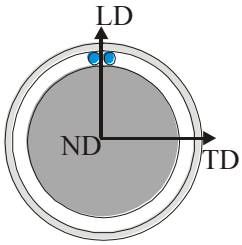
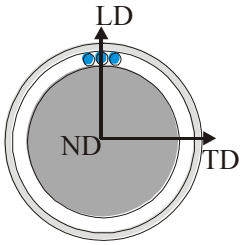
Texture Standards (Reference Samples)

Thanks to the reference samples, the imperfections in the geometrical arrangement of texture goniometer, the correctness of beam optics set-up, and regularity of detection of diffraction effects can be verified. Each set of texture standards contains following reference samples for analysis of crystallographic texture: texture free - random orientation distribution (powdered sample), texturized with orthorhombic sample symmetry (massive sample), texturized with triclinic sample symmetry - (massive sample). Each set of texture standards has its own unique serial number and hermetic container. Samples are in form of metal disks 27 mm in diameter and ca. 6 mm in thickness. The reference samples are circles 20 mm in diameter. Each of the samples is surrounded by an outside metal ring with a suitable colour marker (dots) placed on its co-sample surface. Markers indicate the Longitudinal Direction which together with the Transverse and Normal Direction determine the sample framework (LD, TD, ND) defined in the way is shown in Table below (the table contains also others details by way of example for the austenitic stainless steel standards):

Schematic view with ascribed framework (LD, TD, ND)	Type of marker	Description of Figures	Related Filenames (LaboTex format)*	Crystallographic Lattice	Sample Symmetry
 **powdered (texture free)**	**one dot**	**Austenite-powder**	**Austenite-powd_.epf Austenite-powd.epf Austenite-powd_.pow Austenite-powd.pow**	**cubic**	**arbitrarily chosen**
 **massive (texturized)**	**two dots**	**Austenite-ort**	**Austenite-ort_.epf Austenite-ort.epf**	**cubic**	**orthorhombic**
 **massive (texturized)**	**three dots**	**Austenite-tri**	**Austenite-tri_.epf Austenite-tri.epf**	**cubic**	**triclinic**

***) FileName_ - denotes experimental data corresponding to intensity of diffraction peak (by PIM).**
FileName - denotes experimental data corresponding to integrated intensity of peak profile (by IM).

In the case of the powdered reference sample, because of lack of any planar anisotropy, the LD direction can be chosen arbitrarily during measurement and data processing procedures. Marker on powdered samples indicates direction of mounting in goniometer analogically as LD direction for massive samples.

Standard samples with container have the weight of about 300 g.